THE INDUSTRY'S RECOGNIZED AUTHORITY

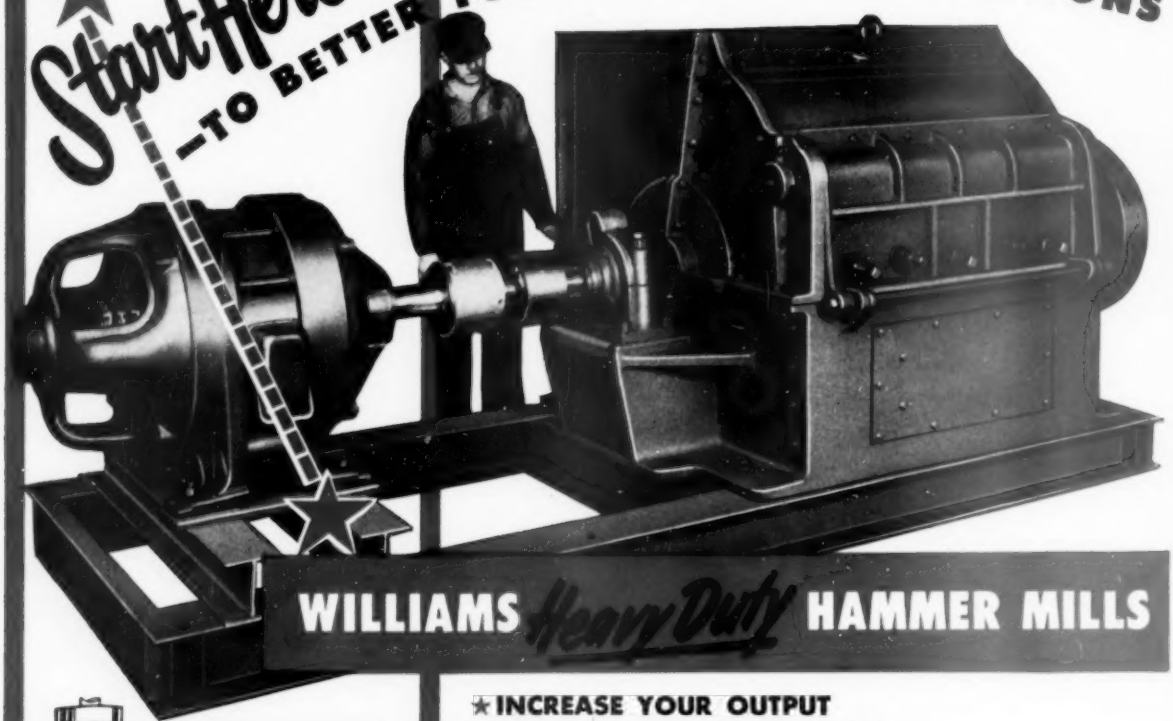
ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

NOVEMBER
1953

Crushing and screening plant of
M. C. Granite Co., Fortson Ga.

Start Here —TO BETTER YOUR GRINDING OPERATIONS



WILLIAMS *Heavy Duty* HAMMER MILLS

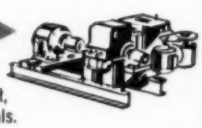
OTHER WILLIAMS EQUIPMENT

▲ ROLLER MILLS
—IMPACT and DRYER MILLS
—for fine grinding to 400 mesh or micron sizes

▲ AIR SEPARATORS
—any type; for precision control and high production in fine grinding

▲ VIBRATING SCREENS
1 to 3 decks, —in any size for any job. open or enclosed.

HELIX-SEAL MILLS
—for dust-free grinding, and for wet, sticky, greasy materials.



Also: COMPLETE "Packaged" PLANTS for crushing, grinding, separating.

★ **INCREASE YOUR OUTPUT**
★ **IMPROVE PRODUCT QUALITY**
★ **REDUCE YOUR COST-PER-TON**

★ No matter how tough your grinding, crushing or shredding job—no matter what the material; mineral, vegetable, chemical or animal—there's a Williams Hammer Mill engineered especially to get the finished product you want in a single operation—**A SAVING UP TO 50% IN PRODUCTION COSTS!** Extra primary and secondary crushers are unnecessary—foundations and buildings for additional machines, drives, conveyors and other equipment are eliminated—**A SAVING UP TO 75% IN EQUIPMENT COST!**

Many Williams exclusive design and construction features assure greater accuracy to meet the most difficult product specifications—and promise continuous satisfactory performance under the most severe operating conditions with an absolute minimum of maintenance.

Consult with Williams about increasing your grinding output and reducing your costs. Tell us about your operation at the time you **Write For Complete Catalog.**

★ **WILLIAMS TESTING LABORATORY WILL HELP YOU**
Complete testing and research facilities are maintained by Williams to find the right answers for you on every size reduction problem. Write for information.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 St. Louis Avenue ★ ★ ★ St. Louis 6, Mo.

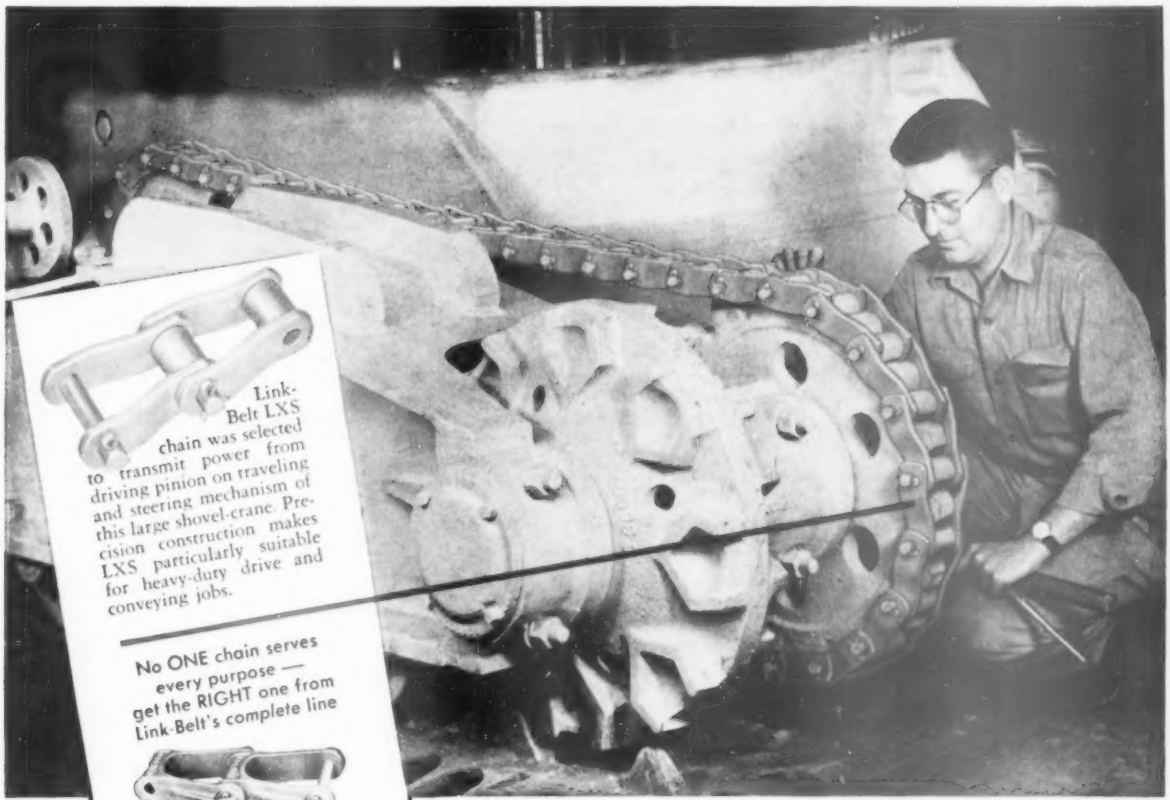
WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

For long chain life under severe drive or conveyor service . . . it's

LINK-BELT LXS



Link-Belt LXS chain was selected to transmit power from driving pinion on traveling and steering mechanism of this large shovel-crane. Precision construction makes LXS particularly suitable for heavy-duty drive and conveying jobs.

No ONE chain serves every purpose — get the RIGHT one from Link-Belt's complete line

Class 800 ley bushed chain—for heavy duty, severely abrasive conveying and elevating.

Class C combination chain—popular, durable, low cost design for elevators, conveyors.

Class H drag chain—for drag conveyors, handling materials or refuse in runways or troughs

Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

LINK-BELT offers the chain that's best for every job

Here's a fabricated steel roller chain that outlasts, outperforms ordinary chain where the going is tough. Accurate sizing of full-round pins, bushings and pitch holes assures users of Link-Belt LXS chain closer joint fit . . . better wear resistance.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw material specifications and manufacturing processes results in uniformity . . . longer chain life.

For all the facts on LXS chain, and for information on the complete line of Link-Belt chains and sprockets, see the Link-Belt sales representative or distributor nearest you.

LINK-BELT

CHAINS & SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Offices: New York 7; Canada, Scarboro (Toronto 13); Australia, Sydney; South Africa, Springs. Representatives Throughout the World. 1353.5

ROCK PRODUCTS

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Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

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RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

One belt does the work of 3— hauls 900 tons an hour uphill

GETTING iron ore out of a deep pit like this used to call for a series of three or more conveyor belts. No one belt was strong enough, flexible enough to haul that far, that steep.

Then B. F. Goodrich developed steel cord construction. In this exclusive belt design, individual steel cords run lengthwise, each completely surrounded by rubber. These parallel cords give tremendous strength, yet are flexible so that troughing is natural, belt keeps centered on idlers, spillage is held to a minimum.

With steel cord construction, a single-flight conveyor now does the job of three or four belts on high lift, long distance installations. Money is saved, handling is faster because the steel cord belt eliminates the transfer point necessary with a conveyor system built in several stages with ordinary belts.

Extraordinary records made by the B. F. Goodrich belt on other "impossible" jobs convinced this mining company it would stand the strain on this one. The B. F. Goodrich steel cord belt was installed, and has been at work ever since—summer and winter—hauling 900 tons an hour up the steep incline.

If you need a conveyor belt that must take severe impact on loading, and haul heavy loads up steep inclines, let your local BFG distributor show you how a B. F. Goodrich steel cord belt can do the job more efficiently and at lower cost than a system built in several flights. Or send the coupon below for more information.

The B. F. Goodrich Company
Dept. M-107, Akron 18, Ohio

Without obligation, please send information on:

- ☐ steel cord belts
- ☐ other products (name type) _____
- ☐ Have a BFG distributor see me

Name _____

Company _____

Address _____

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

ALLIS-CHALMERS

GRINDING MILLS

SPIRAL LINERS make grinding MORE PROFITABLE

INCREASED CIRCULATING LOAD
. . . LESS OVERGRINDING . . .
Material is kept on the move. Large balls do not overgrind fine particles needlessly. Percentage of circulating load has been *tripled* on several mills equipped with spiral liners!

EFFECTIVE BALL SEGREGATION
Large balls at feed end break large particles of incoming feed. Small balls concentrate at discharge end where they utilize greater ball surface for grinding smaller particles.

SIMPLIFIED FEEDING
Ball charge does not fight incoming feed. Motion imparted to balls and material by spiral liners results in a low level of balls at feed end and a higher level at discharge end.

INCREASED CAPACITY
More material can be put through mill in a given time. Retention time of material in the mill is reduced. Power cost is less — no power is wasted on overgrinding . . . ball segregation increases efficiency.

For application of spiral liners to your grinding mill, call the Allis-Chalmers representative in your area, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4155

ALLIS-

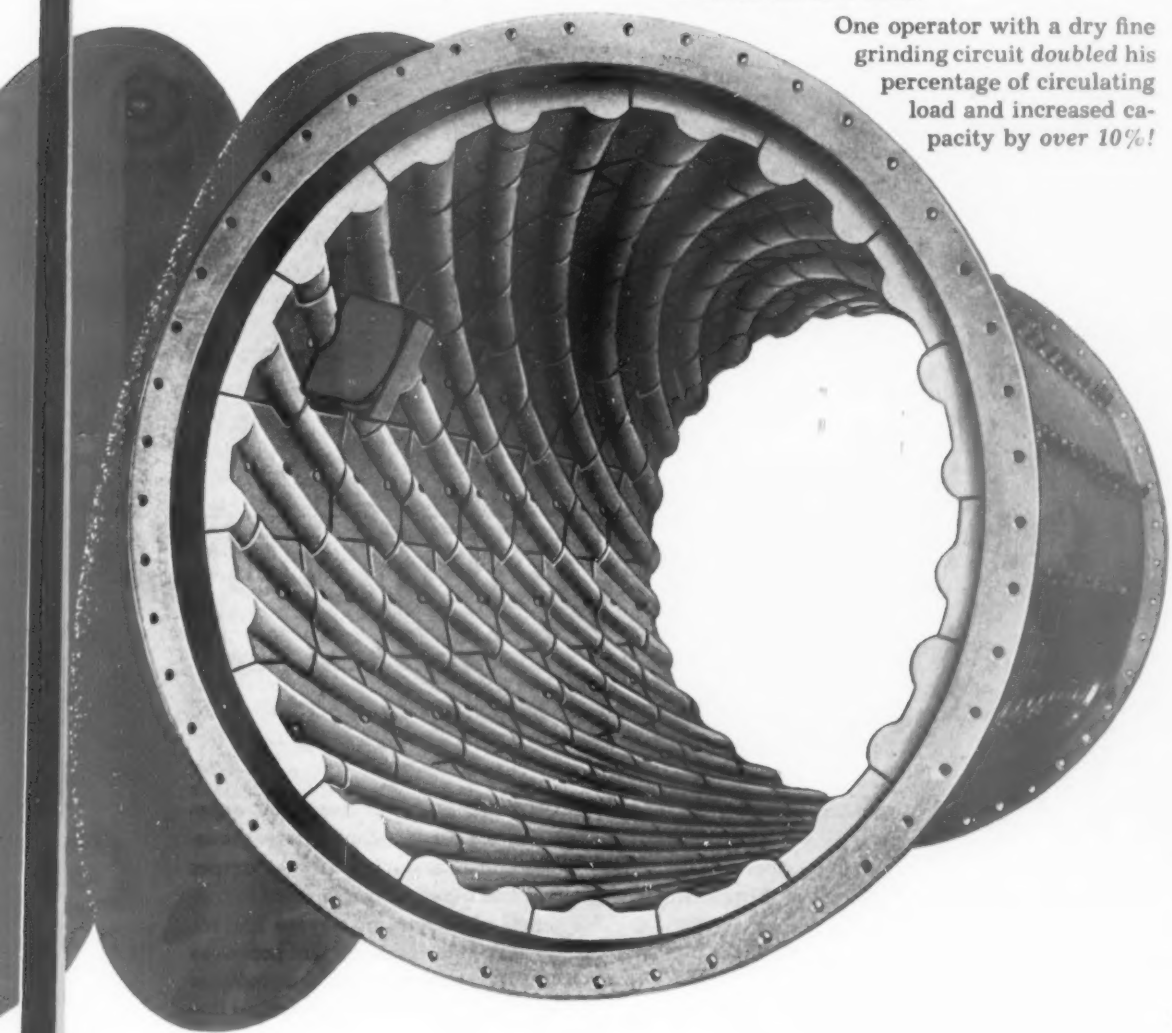
MILWAUKEE 1,

HERE ARE USER EXPERIENCES . . .

One operator with mills in a coarse wet grinding circuit *tripled* his percentage of circulating load with spiral liners.

Another wet grinding mill operator *tripled* circulating load and increased capacity by nearly 10%! Plans at this plant call for spiral liners for all ball mills.

One operator with a dry fine grinding circuit *doubled* his percentage of circulating load and increased capacity by *over 10%!*



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A-C ALLIS-CHALMERS

Tractor-Scraper Parts rebuilt with

VICTORALLOY

outwear new parts

2 to 1

In addition . . .
VICTORALLOY cuts rod cost and reduces welding time 25 to 50%.

HERE'S HOW:

VICTORALLOY is an all-position rod . . . vertical surfaces, end bits, blades, etc., can be hardfaced in position.

High burn-off rate, 6 lbs. per hour, speeds application.

One pass with VICTORALLOY'S high, rounded bead deposits as much metal as most rods do in two passes.

No slag interference—you eliminate chipping and cleaning.

Try VICTORALLOY NOW. Order a supply from your VICTOR dealer TODAY.

VICTORALLOY is designed especially for track rollers, idlers, grousers, end bits, cutting edges, tamper feet and other parts subjected to continual abrasion and severe impact. Its high chromium content produces a hard, polished finish that reduces friction . . . and doubles working life.

Write for literature on complete line of hardfacing alloys by VICTOR. Dealer inquiries invited.

VICTOR

Welding and Cutting Equipment Since 1910

292

VICTOR EQUIPMENT COMPANY

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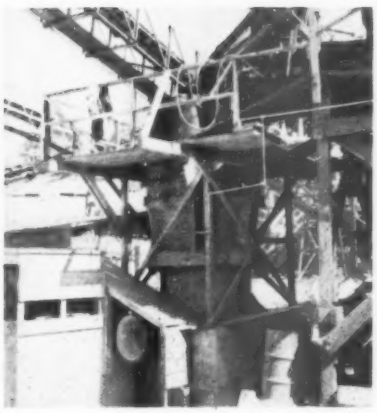
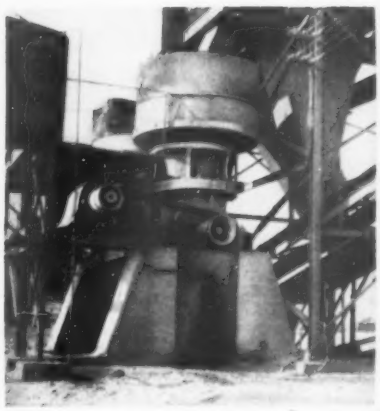
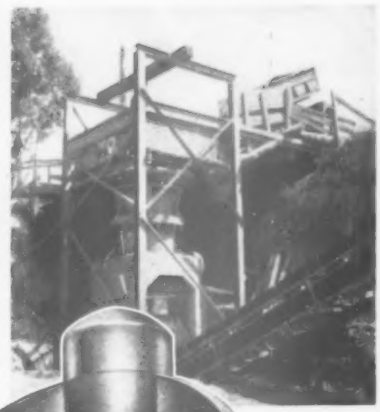
806 OWNERS OF TRAYLOR TY REDUCTION CRUSHERS SAY

Production is the Payoff...





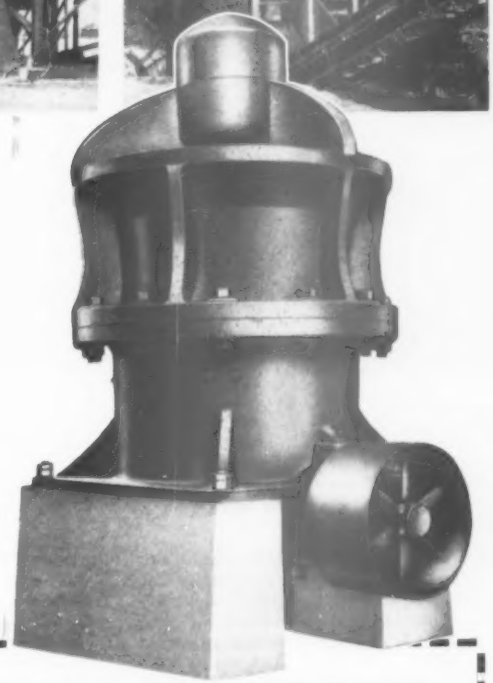


Greater Tonnage...Greater Profits

THE EXCLUSIVE Traylor design features and extra-heavy construction of a TY Reduction Crusher increase your production tonnage by reducing maintenance down-time and boosting hourly out-put with fewer waste fines.

Traylor TY's original, self-tightening bell head and curved concaves apply crushing power with greater efficiency. Increased capacity of each succeeding zone in the crushing chamber permits fine settings to produce greater tonnages with reduced power requirements.

Type TY Traylor Reduction Crushers are of compact design . . . incorporating maximum strength with simplified operation. Six sizes with feed openings from 3″ to 22″. Send for free bulletin 7112.



Traylor

TY REDUCTION CRUSHERS

TRAYLOR ENGINEERING & MANUFACTURING CO.
1555 MILL ST., ALLENTOWN, PA.

Send me Bulletin 7112 with complete description, illustrations and specifications on Traylor TY Reduction Crushers.

Name: _____

Position: _____

Company: _____

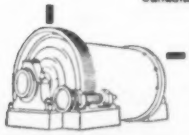
Address: _____ *State:* _____

Sales Offices: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

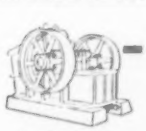
Primary Gyratory Crushers

Rotary Kilns

Secondary Gyratory Crushers



Ball Mills



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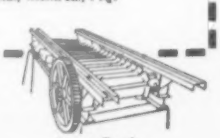


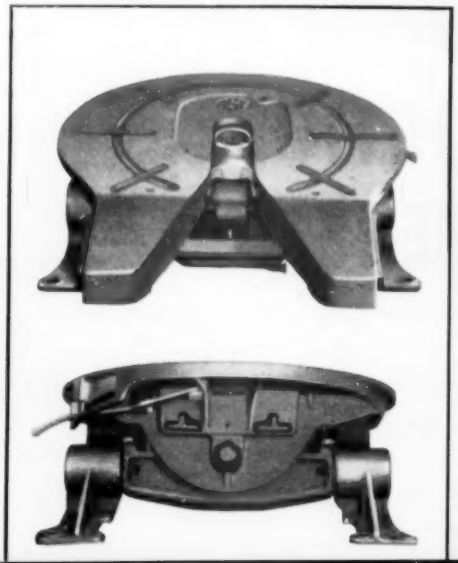
Apron Feeders

Marion shovel, loading a 34-ton coal payload into one of 23 Austin-Western trailers powered by Dart tractors. Scene is at Midland Electric Coal Corporation's strip mine near Farmington, Ill.

ASF Safety 5th Wheels have to be tough to stand up in this heavy-duty service, especially during wet weather when tractors are needed at each end of the semi to get it out of soft ground. Because ASF 5th Wheels are so easy to uncouple, in effect Midland has a *flexible pool* of load-carrying equipment and motive power, rather than 23 separate units. The result is fuller, more efficient use of available equipment.

Back and turn on a dime—In addition to quick interchange between motive power and load-carrying equipment, the tractor-trailer is highly maneuverable. ASF 5th Wheels are side-oscillating: even a full load can be safely and easily jackknifed for a short turning radius.

Heart of the semi—the ASF 5th Wheel—36" extra-heavy-duty ASF Safety 5th Wheel made for the rugged service and heavy loads found in off-highway work. Note the heavily reinforced plate; the massive "I" section center beam; the extra-strong mounting brackets.



He speaks through firsthand experience—M. R. Heckard, Superintendent of Equipment, has used ASF Safety 5th Wheels on all semi's for 11 years. He particularly likes the comparatively new 36" wheel shown at left; feels it will cut maintenance costs to a new low.

The Midland Electric Coal Corporation proves that your best investment for efficient tractor-trailer operation is an ASF Safety 5th Wheel . . .

"Best of all—they're easy to uncouple"

Ease of uncoupling is one of the big reasons why ASF Safety 5th Wheels are standard equipment on the fleet of semi's at Midland Electric Coal Corporation's strip mine near Farmington, Ill. M. R. "Marty" Heckard, Superintendent of Equipment, says:

"We use ASF 5th Wheels on all our semi's, and each wheel takes a real beating during the loading and hauling of a 34-ton payload around 30 times a day.

"One of the main reasons why we like these 5th Wheels is because they are easy to keep free of slack. We just add a shim usually once a year.

"Best of all, however, they are easy to uncouple in a matter of minutes. We can easily shop the tractor for maintenance without the trailer, or vice versa. Working on one at a time makes servicing easier, and we avoid tying up the whole semi."

Quick interchange between motive power and load-carrying equipment is a real asset in mining and quarry work. And there's no denying that you get it with a tractor-trailer. But a 5th wheel—or any hitching device—tends to defeat its purpose if it's hard to uncouple.

Easy uncoupling can save you time, trouble and expense, as it has in this modern strip mine operation. But, it's equally important to know that the ASF Wheel *only uncouples when you want it to uncouple.* This is no beefed-up highway wheel. It's made specially for heavy-duty off-highway service, from the "I" section center beam to the side-oscillating plate that absorbs the sidestrain of uneven roadway. Until a twist of the wrist releases the king-pin, it's built to *stay* coupled—come shocks, strains or high water!

Get the facts on the best 5th wheel investment you can make! See your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

remember this . . . about ASF safety 5th wheels

Largest king-pin bearing area of any 5th wheel . . . Stresses absorbed by a larger bearing area—larger than any other 5th wheel—means longer life for king-pin and jaws.

Shorter king-pin bending leverage . . . Jaws grip the king-pin at the top. The pin *stays straight*—and can't "spring" or disengage.

Side oscillation protects equipment . . . 1½° of free oscillation—plus 5½° controlled by rubber stabilizers—absorbs sidestrain of uneven roadway.

Heavy, cast alloy-steel construction . . . Plate is hinged on strong, rigid "I" beam with big 2" pin. Extra large contact area between plate and beam doubles rocker life. Both rocker and cast-steel bracket are bronze-bushed to cut wear to a minimum.

Easy to maintain in perfect operating condition . . . Wear is inevitable, but on ASF Wheels, it's easily counteracted simply by inserting one or more low-cost shims between buffer and housing front wall. Result? Like-new service, without expensive rebuilding!

A quick glance tells you the lock is LOCKED . . .

LOCKED—as quickly shown by the lever and safety latch—which can *only be in these positions* when the jaws are truly locked.

UNLOCKING—with an easy twist of the wrist. Simply move the safety latch up, and pull the lever forward.

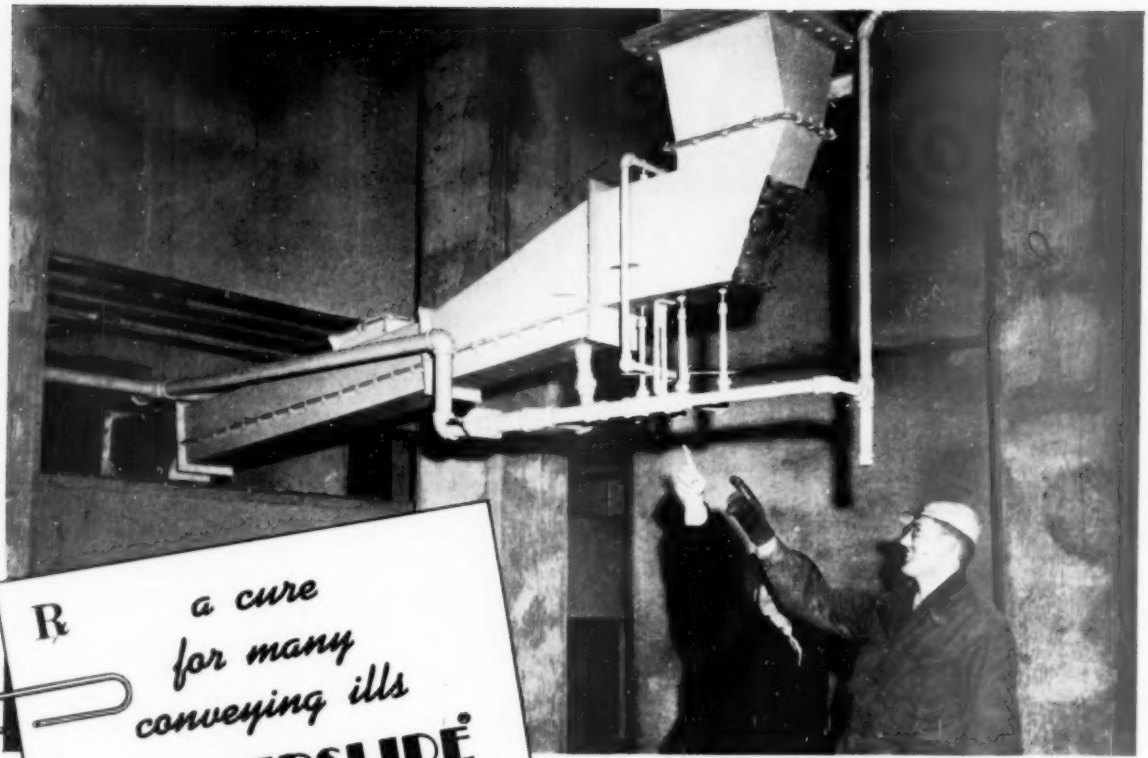
UNLOCKED—ready for uncoupling; parts in lockset position. *Handle can only move back to locked position when the jaws are locked in the next coupling operation!*

A 3,000-pound "compression-grip" saves your maintenance dollars . . .

COUPLING — as the king-pin enters the jaws, the jaws are forced back against the exclusive ASF rubber buffer block, building up compression.

COMPRESSING — 3000 pounds are built up before the lock clears the rear jaw, allowing lock to snap to locked position.

LOCKED—and the jaws *remain* under compression. The grip is like a vise; eliminates the slack and backlash that can cost you money in added 5th wheel and king-pin wear.



R a cure for many conveying ills F-H AIRSLIDE

F-H Airslide and F-H Airfeeder transporting Portland cement from a silo to a screw conveyor. Rapid, clean, safe, economical, and efficient transfer of material.

Maybe your production is suffering because of stoppage and breakdown ills in your conveying systems. These can be very serious and costly . . . timeouts can never be recovered. When you have a "sick" conveying system, why not consult a specialist, one which has pioneered in the field of conveying by air for 26 years.

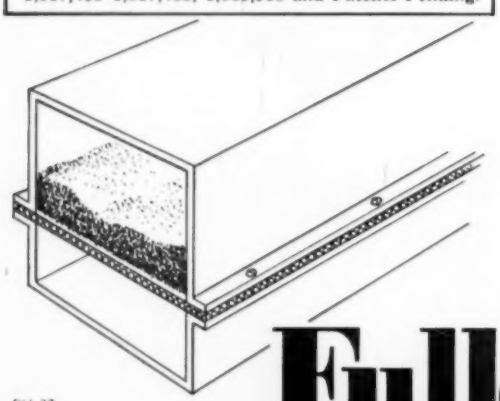
Fuller designs and builds four basic systems for conveying dry, fine materials, from which it can select and recommend the one, or a combination, to meet your own particular requirements, efficiently and economically. We have done it for thousands of others and can do it for you.

Illustrated is one of the four "conveying by air" systems we build, the F-H Airslide, which operates on the principle of fluidizing dry, fine materials with a small volume of low-pressure air, causing the material to flow like a liquid on a slightly inclined plane. Economical of operation, because, it has no moving parts, requires no lubrication, and power required is exceedingly low.

Fuller will be glad to make a study of your conveying ills and make recommendations, together with proposal drawings and estimates . . . with no obligation for this service.

Write today for Bulletin FH-2, illustrating and describing the F-H Airslide Conveyor.

Fuller Company is the exclusive manufacturer of air gravity conveyors, except for use in motor vehicles, under Huron Portland Cement Company U. S. Patent Nos. 2,316,814, 2,517,837, 2,527,394, 2,527,455, 2,527,466 2,527,488, 2,589,968 and Patents Pending.



FH-33
1834

Fuller

FULLER COMPANY, Catasauqua, Pa.
120 So. LaSalle St. Chicago 3
420 Chancery Bldg., San Francisco 4

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

YOU get more for your money than just a tractor!

WHEN you buy a piece of Cat* equipment, you think of a lot of other things besides tough steel and yellow paint. Things you can't see or feel or touch, but that will help you make *more money this year—and year after year!*

You *know*, for instance, that you can count on profitable production because your equipment will keep you on schedule. Its stamina, *plus* on-the-spot service from your Caterpillar Dealer, cuts down time to the minimum.

You *know* the bank will give you better financing on big yellow machines because of their reputation.

You *know* there are no "orphans" in the line. You can work Caterpillar machines profitably for years and *always* get parts for them—at the standard low list price.

You *know* that day after day, week after week, month after month, they will do *more* work with *less* down time at *lower* cost than any competitive units.

And, finally, you *know* that when you're ready to trade in a Cat machine you'll get more money for it—the *top* resale value in the field.

Getting ready to buy mining units? Fine. Look them all over. *But look at their last cost first.* Remember what you *know* about Caterpillar!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

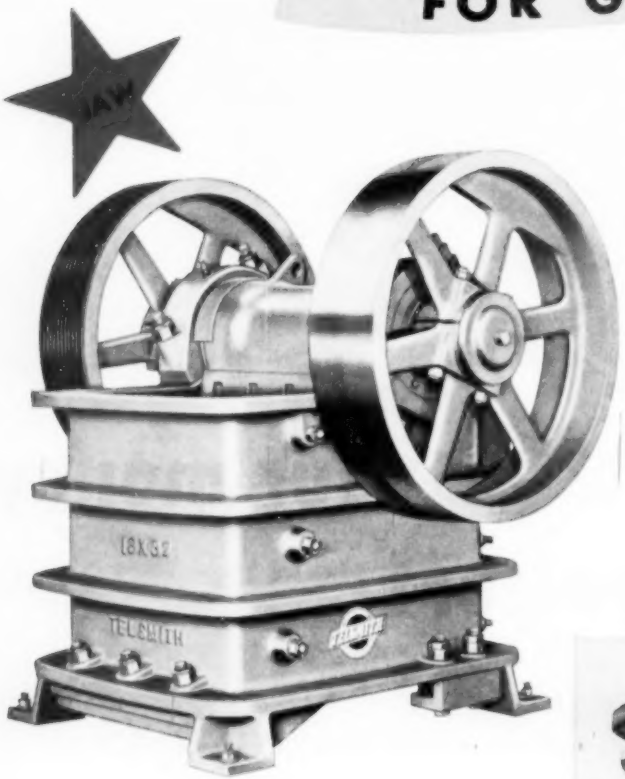
*Both Cat and Caterpillar are registered trademarks

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

TELSMITH®

PRIMARY

FOR GREATER CAPACITY



● **Telsmith Jaw Crusher** has a compact, massive cast steel frame and swinging jaw . . . with large cylindrical roller bearings throughout for higher speed, bigger capacity, and lower power requirements. With its vigorous, force feed, and remarkably effective crushing action, the Telsmith Jaw Crusher turns out a more uniform and cubical product, in larger capacities. Its easy, simple adjustment allows a wide product size range. Made in 9 sizes, from 10″ x 16″ to 30″ x 42″, 22 to 240 tons per hour. Send for Bulletin 280.

● **Telsmith Gyratory Breaker** is short and compact. Steel frame and crown, and rigid pillar shaft are all guaranteed against breakage. Largest feed and crushing areas of any gyratory breaker . . . the famous Telsmith parallel-pinch crushing stroke . . . cut steel drive gears, improved full, force-feed oiling and a roller bearing countershaft give not only faster crushing but crushing by impact, for a better cubical product. 7 sizes: 6B to 25B, 26 to 400 tons per hour. Get Bulletin 281.

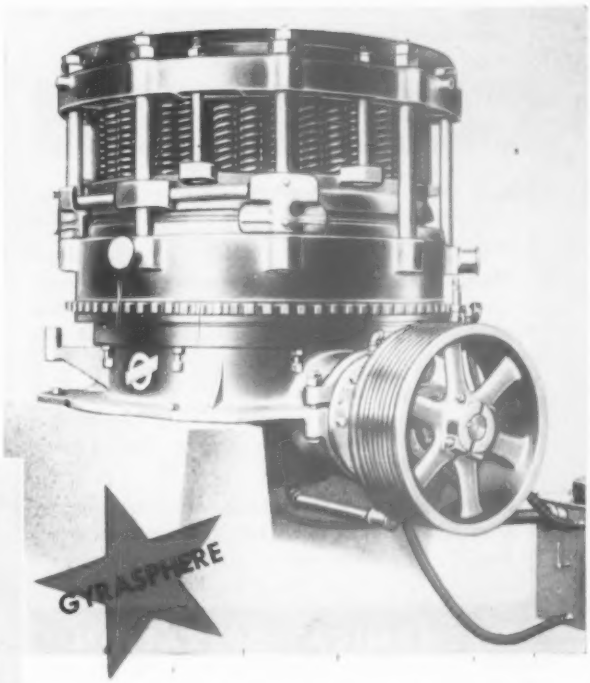
SMITH ENGINEERING WORKS
508 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

CRUSHERS

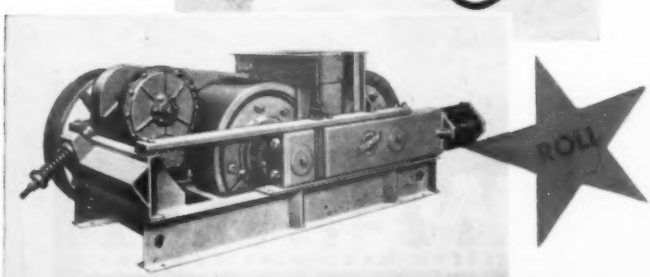
SECONDARY

LOWER COSTS • BETTER PRODUCTS

● **Telsmith Style S Standard Gyrasphere** has new, heavier design with many time-tested features for greater capacity, a more uniform product, low-cost operation, and quick accessibility for easier maintenance. 24″ to 48″ sizes, coarse or medium bowl; 45 to 300 tons per hour. New 489-S size has 10″ receiving opening. *Style FC Fine Crushing Gyrasphere* has all Style S features with several additional fine crushing improvements. 24″ to 48″ sizes; medium or fine bowl, 15 to 125 tons per hour. Send for Bulletin 274.



● **Telsmith Intercone** is an all-steel, high-speed, lower priced secondary crusher. Turns out very uniform, cubical, coarse or intermediate product. Lead bronze bearings, Telsmith patented rotary seal, roller bearing countershaft, full force feed oiling, spring relief protection. 18″ to 28″ sizes; 26 to 70 tons per hour. Get Bulletin 270.



● **Telsmith Double Roll** for large capacities of intermediate or fine aggregate at low reduction ratios. Compact, light in weight, low in cost. Anti-friction bearings run in oil. 24″ x 16″ to 40″ x 22″ sizes. 75 to 132 tons. Get Bulletin 282.

CS-8

Cable Address: Simpwerks, Milwaukee
41 East 42nd St., New York 17, N. Y. · 314 W. Washington Blvd., Chicago 6, Ill. · 712 Commercial Trust Bldg., Philadelphia 2, Pa. · 235 Main Street, Cambridge 42, Mass. · Barkelo Equipment Co., Milwaukee 1, Wis. · The McLean Co., 3478 Lakeside Ave., Cleveland 14, Ohio
Marcus Equipment Co., Rochester, Mich. • Mish Equipment Co., Cincinnati 14, & Portsmouth, O.—Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 16, Va.
Robert S. Bailey, 816 W. 8th St., Los Angeles 17, Calif. • Minos Eng. & Equipment Co., San Francisco 4, Calif. • Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash.

WEMCO SAND PREPARATION MACHINES

an exclusive design... *that earns extra profits for you*

From either standpoint — profits or operating costs — you're dollars ahead with Wemco Sand Preparation Machines. These modern designed Wemco units are unmatched for their ability to produce desired tonnages of specification sands at lowest possible cost. Owners of Wemco Sand Preparation Machines consistently earn higher profits because the exclusive design of these units means greater efficiency in terms of the following important factors:

PRODUCTION RESULTS

Fine Fraction Control — for elimination of slime, clay and other foreign materials, with exact retention of desired quantities of fine sands.

Medium Fraction Control — with sharp segregation between coarse and fine particles for the control of wastage and the exact blending of middle size screen fractions.

Coarse Fraction Control — with thorough washing action and accurate segregation of medium and fine sizes to allow sharp blending for desired specifications.

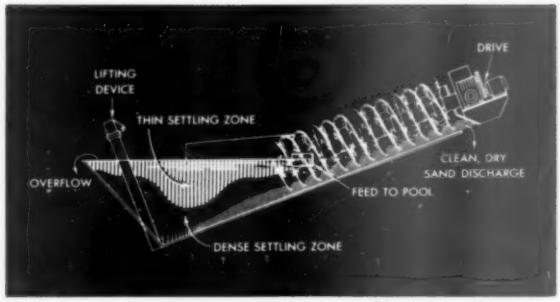
Dewatering and Desliming — for high capacity production of sands of all sizes, clean in content and free of excess moisture.

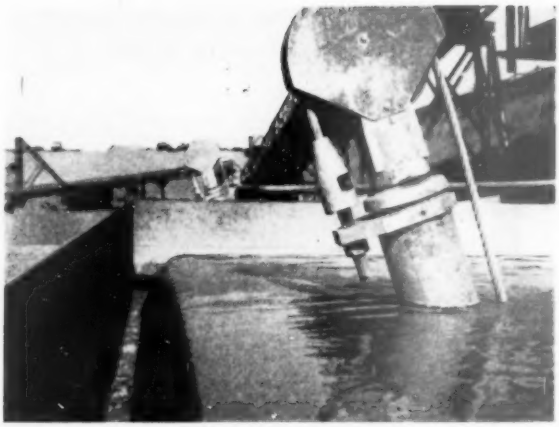
MECHANICAL OPERATION

Large Settling Tank — greater effective pool area and wide overflow weir for proper flow velocity and improved settling conditions.

Large Capacity Spiral — advanced pitch design for greater raking capacity at reduced speeds and more thorough mixing, washing and draining of sand product.

Lower Operating Costs — because of long-life wearing parts, less maintenance, minimum operator attendance and low power consumption.





Large pool area, controlled agitation assures proper conditions for rapid settling of desired sands.

Write Wemco today for further information and recommendations on your sand production problems. Send for free Bulletin C-1-0-2.

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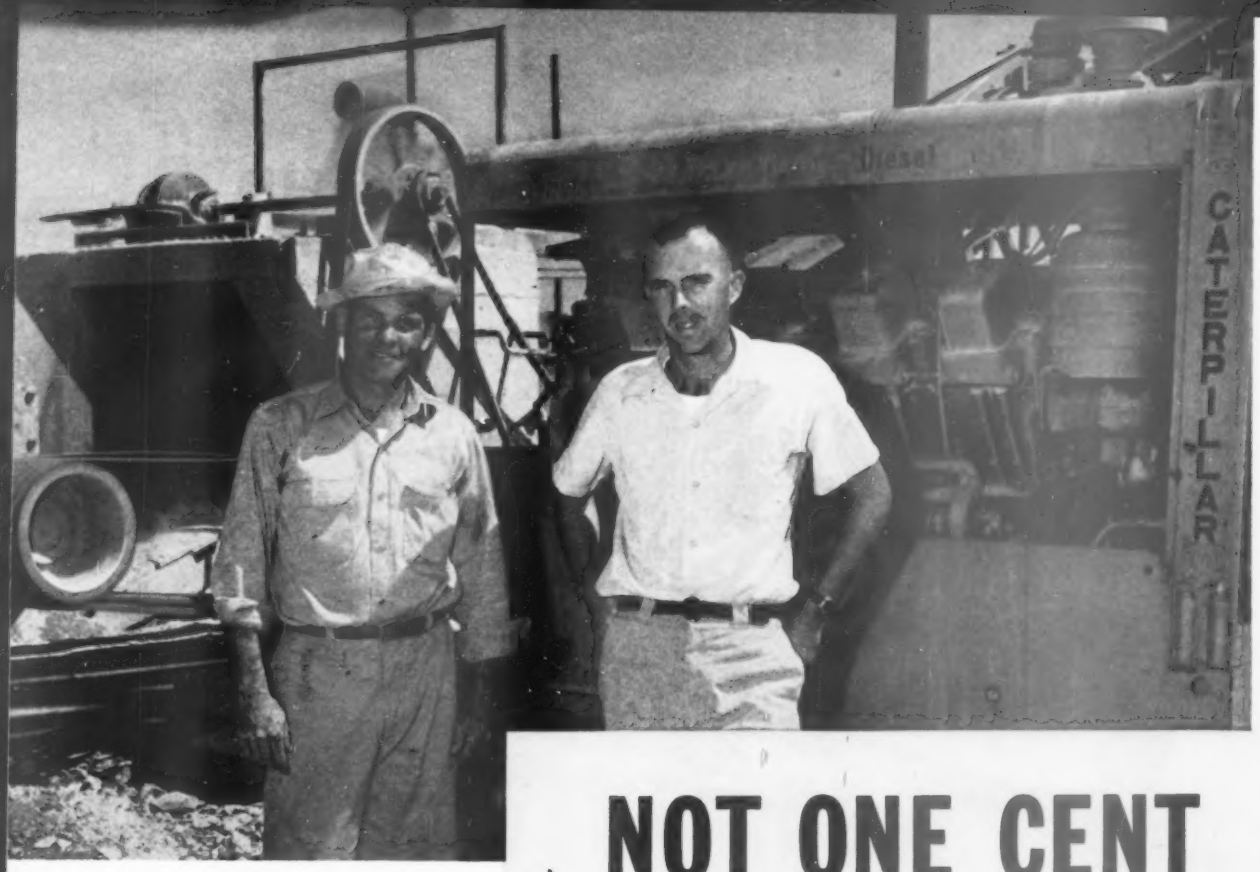

NOT ONE CENT FOR REPAIRS!

This veteran Caterpillar D17000 Diesel Engine has furnished steady power for a 40" Williams pulverizer, six days a week the year around for six years, with no repair cost! Standing beside it are Ralph Barrett, left, superintendent of Jones Construction Co., and W. S. Jones, superintendent of Jones Rock Co., of Emporia, Kans. The plant produces 400 yards of crushed rock per day for Kansas state highways.

Mr. Jones reports that this Cat* D17000 uses only 35 gallons of low-cost No. 2 furnace oil per 8-hour day—a saving of one-third over former power! It can deliver a full 200 HP, and idle without fouling, on this money-saving fuel. Where the previous unit was temperamental and ran hot, there's no need to tinker with this reliable engine.

A second Cat Engine, a D7700, powers the primary crusher at the plant. Other Caterpillar equipment on the job includes 10 track-type tractors and five rubber-tired W10 Wagons. Mr. Jones speaks from experience when he comments on the rugged simplicity of Caterpillar units: "We can easily overhaul a Cat Engine and get it back to the same power it had. Other make engines we've had were nothing but grief and expense."

Many quarrymen find that it pays to standardize on long-lived Caterpillar Engines for maximum profit. There are 12 honestly rated engines and electric sets, up to 500 HP and 315 KW. Ask your nearby Caterpillar Dealer for proof of performance—and count on him for fast, skilled service and genuine factory parts.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

WE'VE MADE CLAIMS... NOW MAKE US PROVE THEM

the NEW "111" CRUSHING AND SCREENING PLANT

...OFFERS YOU THESE ADVANTAGES

MORE PRODUCTION—All individual units other than the crushers are driven with separate electric motors permitting top operating speed and efficiency at all times. Crushers are driven directly from the diesel power unit.

LOWER MAINTENANCE—Independent electric motor drives eliminate the need for excess shafting, clutches and gearing.

ONE MAN OPERATION—The man on the platform with *push buttons* starts and stops the delivery conveyor, feed conveyor, screen, rotary elevator and plant conveyor giving him positive control of these units at all times.

GREATER PROFITS—Because of the versatility and engineering advantages of the "111" Plant, low cost tonnage paves the way for greater profits for the user.

Note: Austin-Western crushers are now being engineered and manufactured in Lima, Ohio, enabling us to maintain steady, top-quality production of crushers.

Austin-Western
CRUSHING, SCREENING and WASHING EQUIPMENT

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

BLH Construction Equipment Division

IN THE PIT! IN THE PLANT!

save your rustable metal surfaces indoors and out!

STOP RUST! with RUST-OLEUM

Protect Your Equipment, Pipes, Conveyors, Crushers, Dusters, Metal Structures, Tanks, etc.

RUST-OLEUM can do a whale of a job for you in helping to resist fumes, dust, rain, snow, moisture, and weathering! So easy to apply that *one man* often does the work of two – just wirebrush and scrape with sharp scrapers to remove rust scale and loose particles – then apply by brush, dip, or spray directly over remaining rust! Costly sandblasting and chemical pre-cleaning are not usually required. You save time, labor, money – you beautify as you protect because RUST-OLEUM is available in all colors, aluminum and white! Get the facts today. Prompt delivery from Industrial Distributors in principal cities in the United States and Canada.

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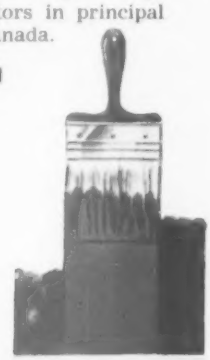
2720 Oakton Street, Evanston, Illinois



May be applied directly over rusted surfaces

Available in all Colors, Aluminum and White

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A SOLID BASIS for Sustained High Output

Bucyrus-Erie Individual Design Matches Strength to Capacity

Plenty of strength, stability, and power for sustained high output is an important result of Individual Design. Every model in the Bucyrus-Erie line is designed and built from the ground up for its particular work range. That's why each model does such an outstanding output job in its class.

Look at the 38-B pictured here. It's a 1½-cubic yard shovel all the way through. Front end, main machinery, power unit, and mounting are all perfectly matched to dipper capacity. That's why the 38-B handles its big loads with outstanding efficiency no matter what the material — rock, shale, dirt, gravel, or sand.

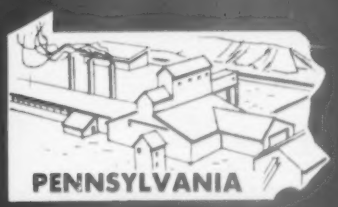
If your quarry or pit calls for shovels, draglines or clamshell-cranes with gasoline, diesel or single-motor electric power in the ⅜- to 4-cubic yard size range, see your Bucyrus-Erie distributor for complete details on how you can step up output with a Bucyrus-Erie — the line that features Individual Design for each model. For information on larger quarry and mine excavators, write direct. 40E53

BUCYRUS ERIE

South Milwaukee, Wisconsin

HAR

ALUSITE



MADE IN BOTH

the established leader in the 70% alumina refractory class

The superior physical properties and chemical composition of ALUSITE long ago established its leadership in the 70% Alumina Refractory Class.

Outstanding service records made by ALUSITE in rotary kilns are attributable to its low porosity, high strength, volume stability and excellent spalling and flux resistance.

Some highly economical applications of ALUSITE are the following:

- **High temperature zones of cement kilns**
- **Transition zones of basic-brick-lined cement, magnesite and dolomite kilns**
- **Calcining zones of lime, lime-sludge, magnesite and dolomite kilns**

Included in Harbison-Walker products are refractories for every rotary kiln plant requirement

Harbison-Walker Refractories Company

AND SUBSIDIARIES

WORLD'S LARGEST PRODUCER OF REFRACTORIES

General Offices . . . . . Pittsburgh 22, Pennsylvania

SWEATING OVER A

Hot Material*

HANDLING PROBLEM?

Here Are 7 Good Reasons Why Rex Pan Conveyors Can Solve It For You When Cooling En Route Is Desired

1. Conveyor designed so that ratio of mass of dead load (pans, etc.) and live load is correct for efficient heat transfer. Maximum initial temperatures are thus easily handled. Localization of intense heat can be controlled.
2. Shape of pans provides maximum surface area for efficient cooling and is suitable for carrying up inclines up to 25°.
3. Chain and carrying rollers removed from intense heat zone.
4. Wear largely confined to heavy, carrying outboard rollers on sleeve-type bushings made of hard, long-wearing, heat-treated white iron.
5. Unique outboard roller construction permits easy servicing without disassembling chain or conveyor. Simple graphite lubrication.
6. Low power requirements because of large diameter carrying rollers.
7. Through rods at joints for increased rigidity and much longer chain life.

* **Calcined, Sintered, Briquetted, Nodulized, etc., over 300° F.**

Investigate the ways that Rex Apron and Pan Conveyors can help solve your hot material handling problems today. Call your nearest Rex Field Sales Engineer or write for complete details. Chain Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY ®

Chain Belt COMPANY OF MILWAUKEE

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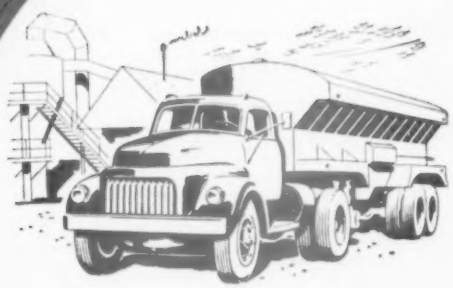
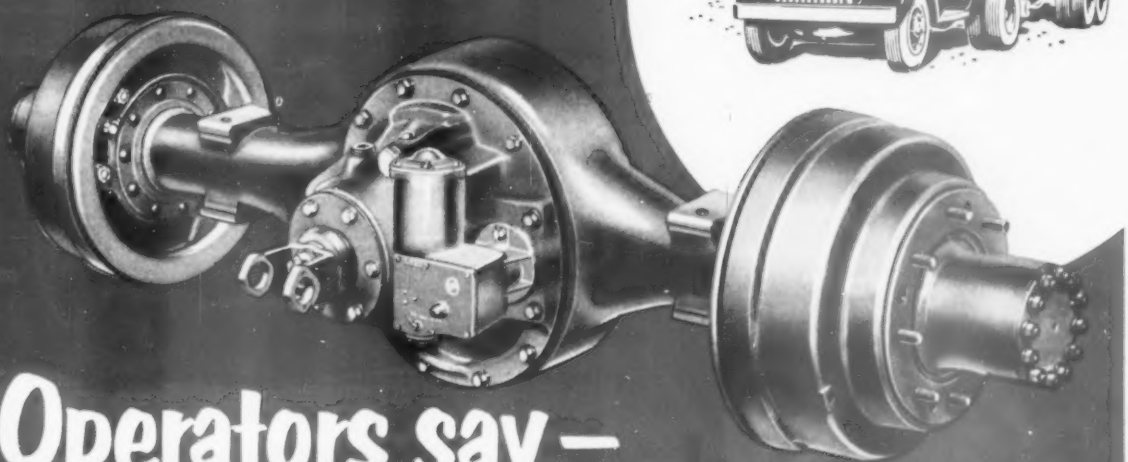
Distributors located in principal cities in the United States and throughout the world
EXPORT OFFICES: 4800 W. Mitchell St., Milwaukee; and 19 Rector Street, New York City

Drivers say—"Eaton 2-Speed Axle trucks are easier to handle, safer to drive."





Operators say—"Eaton 2-Speed Axles cut hauling costs, make trucks last longer."

More than a million-and-a-half Eaton 2-Speeds in trucks today!
For complete information, see your truck dealer.

EATON AXLE DIVISION
MANUFACTURING COMPANY
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PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

☆ ANNOUNCING NEW ☆

DODGE "Job-Rated" TRUCKS

Brilliant new design opens new era in trucking!

☆ Compare their new comfort! ☆ Test their new handling ease!
☆ See their new low work-saving design!

2 GREAT ENGINE LINE-UPS! In addition to cost-cutting 6's, Dodge now offers the most powerful V-8 engines of all leading trucks! Available in 1½-, 2-, and 2½-ton models . . . standard in 2¾-, 3-, 3½-ton! Revolutionary hemispherical combustion chamber for high efficiency! Get free book on engine efficiency and its importance to you at your Dodge dealer's!

OVER 75 NEW FEATURES! Spectacular low-built lines! New increases in G.C.W.! New cab sealing against dust, drafts! Nonskid running boards!

PLUS famous Dodge features like . . . completely rustproofed sheet metal . . . moistureproof ignition! Truck-o-matic transmission with gyrol Fluid Drive, available!

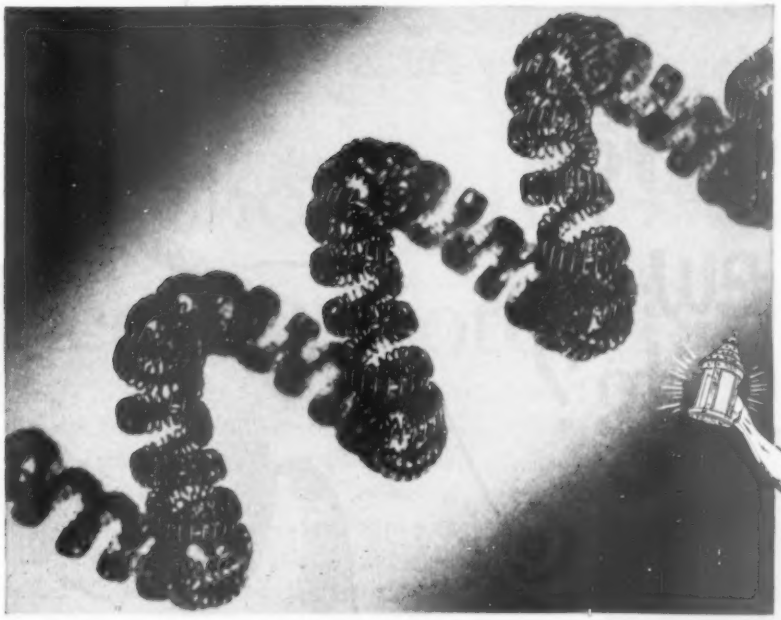
New! Even greater values . . . yet still priced with the lowest!

New! Sharper Turning! New steering system for the shortest turning of all leading trucks! New shorter conventional tractors! New, one-piece windshield! More total vision area than any other popular make!

New! Smarter Styling! New colors! New flow-line design, featuring integral fenders, sparkling chrome! New two-tone interior styling! New wider doors! New easy-chair seats! New instrument panel.

New! Lower Lines! Pick-up and panel floors knee-high for loading ease! Lower running board for easier entry! Lower hood for greater visibility! New, low center of gravity for road-hugging stability!

SEE YOUR FRIENDLY DODGE DEALER!



Shown at the left is a view of the triple-coil tungsten wire used in many modern fluorescent lamps. (Photo courtesy General Electric Lamps)

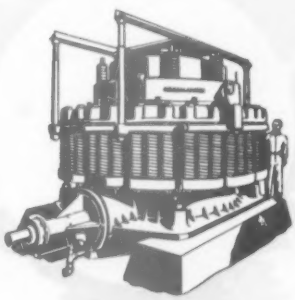
The "ARISTOCRAT OF RARE METALS" might have helped Diogenes . . .

If *TUNGSTEN*, the *"aristocrat of rare metals"*, had been discovered in his time, the Greek Cynic, *Diogenes* might have been able to carry a much brighter lamp to aid in his search for an honest man. For among the many contributions of this metal to modern civilization is the tungsten filament which gives a quality of artificial light otherwise unattainable.

Due to low grade characteristics, and the hard abrasive rock in which tungsten ore is generally found, producers must attain desired particle size for maximum recovery as quickly and economically as possible. It is significant to note the use of SYMONS® Cone Crushers by many of the large tungsten producers . . . who find these crushers particularly suited to tungsten ore reduction because of maximum utilization of crushing surfaces against the highly abrasive material, with minimum wear.

Thus, in tungsten operations . . . *as in all of the great ore and industrial mineral operations the world over* . . . SYMONS Cone Crushers are relied upon to efficiently produce great quantities of finely crushed product at low cost.

NORDBERG MFG. CO., Milwaukee, Wisconsin



SYMONS Cone Crushers...the machines *that revolutionized crushing practice*.. are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter— in capacities from 6 to 900 tons per hour.

C153

NORDBERG MACHINERY — NORDBERG

CRUSHERS SYMONS SCREENS NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

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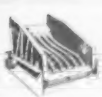
SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD.

SYMONS PRIMARY CRUSHERS

GRINDING MILLS

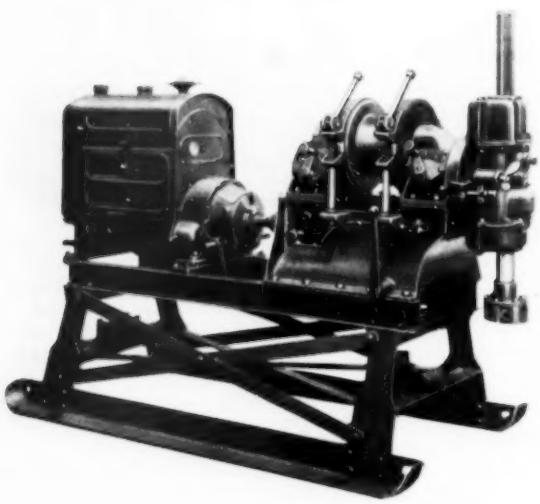
MINE HOISTS



SYMONS VIBRATING BAR GRIZZLIES and SCREENS

DIESEL ENGINES

LOOKING FOR New Deposits?



Whether you're exploring for new quarry sites or extensions of existing deposits, you'll wind up with the right information easier and faster by using the skid-mounted CP-8 and CP-15 Diamond Core Drills. Specifically engineered to withstand the continued high drilling speeds made possible by Bortz bits, they're available with gas, diesel or electric drive – can be readily moved from hole to hole under their own power. Bolted frame permits easy disassembly for transportation to remote sites. With E-EX Fittings the CP-8 has capacities to 1250 ft., the CP-15 to 2250 ft. For more complete information, write: *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Here Are Facts You Should Know About Electric Motor Bearings

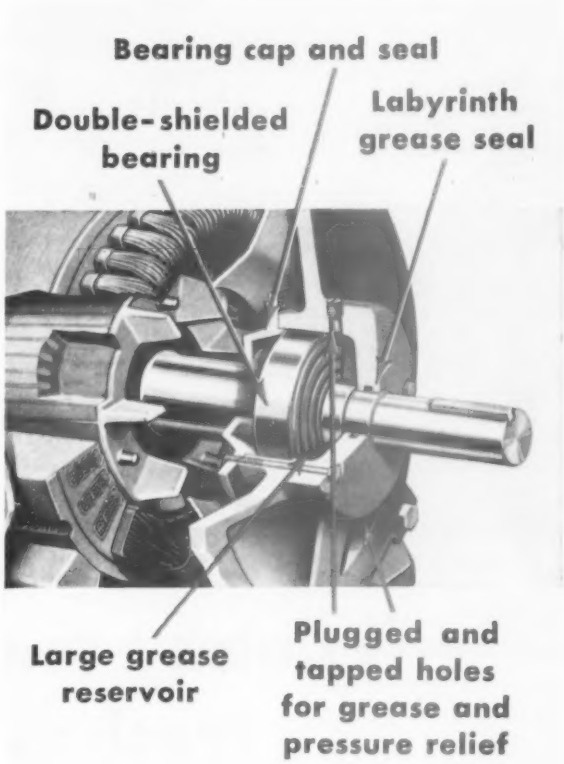
AN ideal motor bearing would operate for indefinitely long periods under all types of conditions without requiring any attention whatever. However, in the opinion of our engineers, such a bearing and its attendant lubricant are not yet available on the commercial market. Consequently, bearings for many types of operations, particularly where overloading, extreme temperature ranges and chemical and dirt laden atmospheres are involved, require special lubricants or regular lubrication schedules.

Of course, bearings suitable for many kinds of operation under normal conditions can be built to require no attention for very long periods — usually several years. Allis-Chalmers can supply sealed bearings in all frame sizes through 505 on short delivery and without extra cost for applications of this type.

Which is the Best Design for *Your* Application?

We believe that the design used in standard Allis-Chalmers drip-proof, tefc and explosion-proof motors represents the best design for most industrial users.

The Allis-Chalmers standard design consists of a pre-lubricated, double-shielded bearing mounted in the end housing with a generous grease reservoir. Plugged and tapped holes are provided for grease and for pressure relief. Under normal operating conditions, this design will operate as long without attention as any other type of bearing in use today. But where difficult operating conditions make re-lubrication desirable, it can be done as part of the normal lubricating routine without dismantling the motor.


Bearing cap and seal
Double-shielded bearing
Labyrinth grease seal
Large grease reservoir
Plugged and tapped holes for grease and pressure relief

The large grease reservoir and shielded bearing design assure that grease lost from the bearing due to high operating temperatures or other causes will be replaced automatically.

For further information on bearing design and other features of Allis-Chalmers motors, call your nearby Allis-Chalmers District Office or Authorized Distributor.

A 4147

ALLIS-CHALMERS

Milwaukee 1, Wisconsin

BIGGEST FORD TRUCK EVER BUILT — New F-900 Big Job is rated for 27,000 lbs. G.V.W. As a tractor with semi-trailer it wheels a 55,000-lb. G.C.W. at a calculated top speed of over 48 mph.

"I finish a tough day's work fresh as a daisy"

"Ford's new *Driverized* Cab is the best break we truck drivers ever had!" says Mr. Pelino Fewello, driver for the U.P.K. Construction Co., of Arcadia, California. "Now driving's less work and Ford's easy handling takes the grunt out of backing and filling.

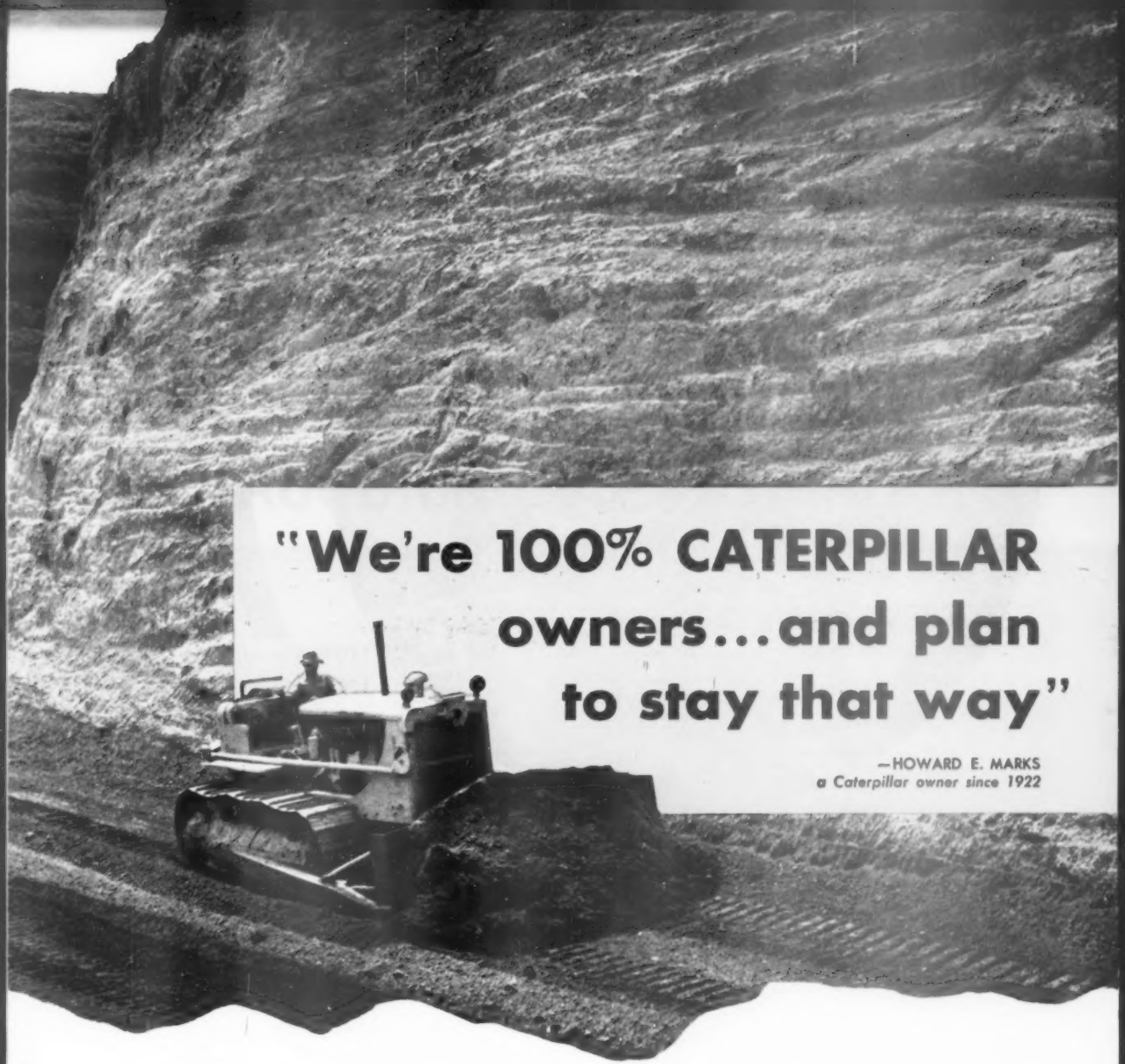
"Pulling a train of bottom dumps carrying an average payload of 30 tons, I really need a truck that can take a beating and keep on going! My new F-900 BIG JOB with 155-h.p. *Cargo King* V-8 engine has just the 'get up and go' I need. Its terrific lugging power makes light work of heavy jobs.

"And our fast moving Ford Trucks are hour-savers! Time is our biggest problem and all of Ford's time-saving and driver-saving features mean money saved."

What about you? Could the time-saving, cost-cutting features of a dependable Ford Truck help you? For complete information write: Ford Division, Ford Motor Co., Dept. T-13, Box 658, Dearborn, Michigan—or call your Ford Dealer *today!*

FORD
ECONOMY
TRUCKS

SAVE TIME • SAVE MONEY • LAST LONGER



"We're 100% CATERPILLAR owners...and plan to stay that way"

—HOWARD E. MARKS
a Caterpillar owner since 1922

This D8 with No. 8U Bulldozer is one of three Caterpillar-built machines which handle the total output of Skyline Quarry, Belmont, Calif. Daily production is 4000 tons of base rock and concrete aggregate for this and one other D8 with U-'dozer, and a rubber-tired DW10 with No. 10 Scraper.

"We find that Caterpillar equipment has real substance," says the owner, veteran quarryman Howard E. Marks. "It's easy to get good service, and by standardizing on Cat* equipment we cut expenses. We're 100% Caterpillar owners, and plan to stay that way."

Many quarrymen winterize their jobs by standardizing on Caterpillar machines. These husky yellow units are quick-starting and need no pampering, even in sub-zero weather. They have stamina to work in frozen materials, and balance and traction to keep working in tricky footing. They're built to work as far into the winter as *you* want them to work, and then to get an early start again in the spring.

Standardizing on Caterpillar pays off, too, in increased operator familiarity and ease of maintenance, and in one-stop dealer service. Because Caterpillar machines are noted for long, trouble-free work life, they return a profit for many years.

Caterpillar has the industry's fullest line of equipment, with tractor power and blade capacity *matched* for smooth performance and long life. Ask your Caterpillar Dealer for an on-the-job demonstration of the tractor-'dozer team that best suits *your* needs.

Caterpillar Tractor Co., Peoria, Ill.

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150-B, 6 cu. yd.
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THE new Bucyrus-Erie Ward Leonard electric shovels bring to quarry loading the first important departure from the old-fashioned shovel front end. This advanced design — with two-section boom, inside tubular handle, and quiet positive rope crowd — increases speed and payload. It reduces upper boom weight, puts extra strength in the lower section where maximum strength is needed. It cuts out old-style handle racking and crowd pinions, takes the deadweight of crowd machinery off the boom. And, most important to *you*, it gives you all these field-proven performance advantages:

- **Lighter Weight, Greater Strength** — Two-section boom, with light upper section . . . lower section strut-connected to the A-frame.
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- **No Handle Binding in Saddle Block** — Rope crowd is quiet, positive, eliminates handle racking and crowd pinions.
- **No Dipper Wobble** — Twin dual hoist ropes put hoist power where needed for steady travel of dipper through bank.
- **No Sway Braces** — Widespread boom feet eliminate accessory boom braces or cables.
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There's much more to the story, too. Deck machinery, electrical equipment, and mounting all match the front end in advanced engineering and outstanding performance advantages. The full story will convince you that yard for yard, dollar for dollar, pound for pound, these are the finest rock excavators ever built.

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XR53-6

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Besides being self-propelled, the T286 drills in any direction — at any angle — uses less air. One Le Roi Airmaster 600 cfm Compressor provides all the low-cost air you need.

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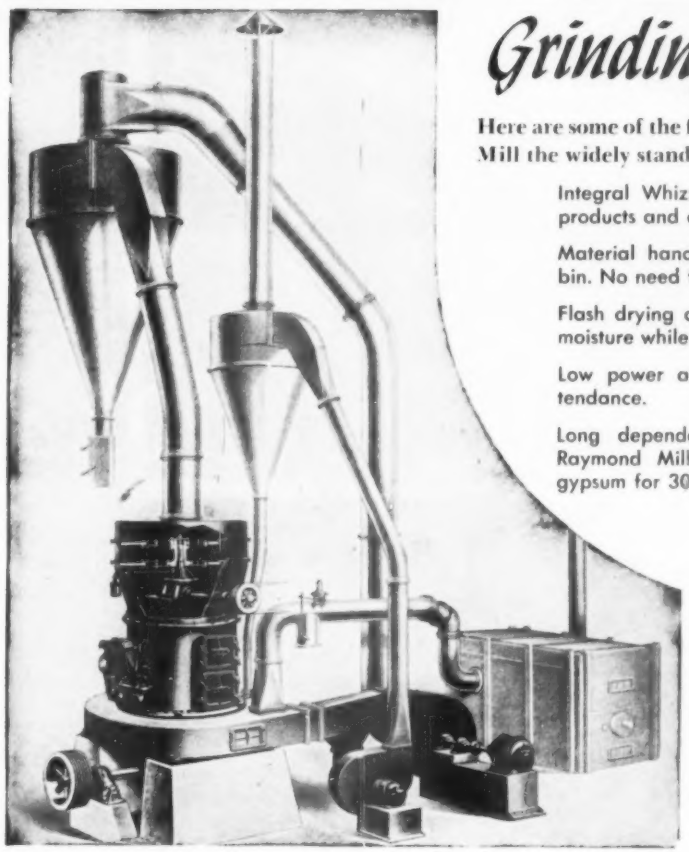

Here are some of the features that have made the Raymond Roller Mill the widely standardized unit in the gypsum grinding field:

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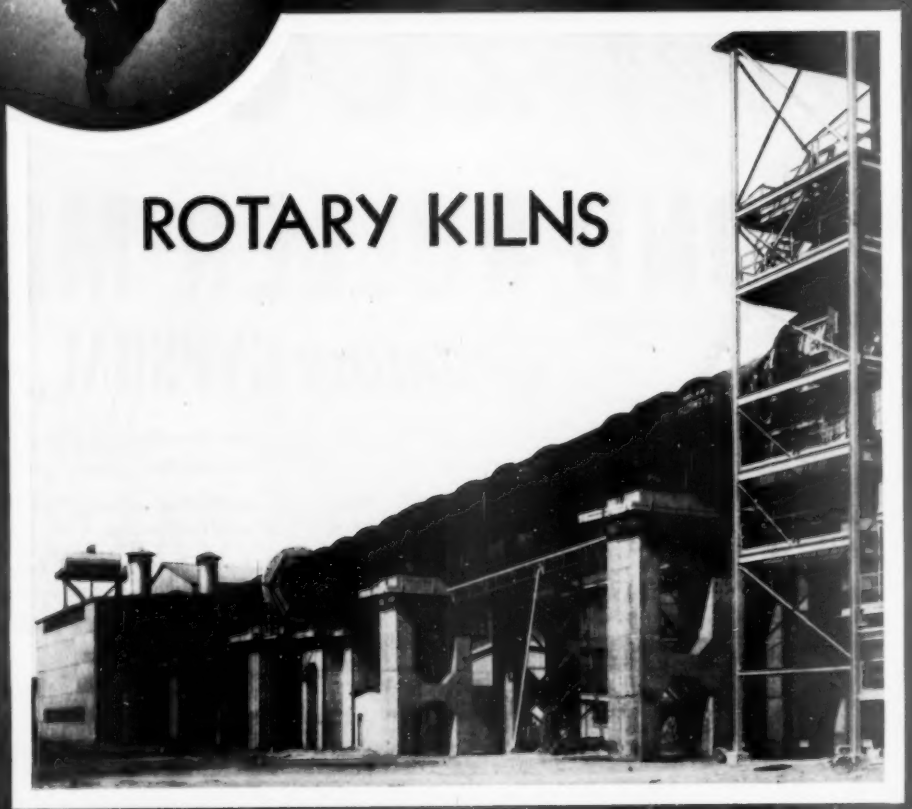

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Smidth equipment has been supplied to over 70 countries of the world including [illegible] rotary kilns and 5000 grinding mills, plus auxiliary machinery such as coolers, agitators, washmills, pumps, conveyors, packers, separators, etc. for use in Cement, Lime and Ore plants.

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"WE HEAR..."

November, 1953

Construction contract awards in the 37 states east of the Rockies, for the first nine months of 1953, totaled $12,857,261,000, which was 1 percent above the comparable 1952 figure, according to an F. W. Dodge Corp. report. The 9-month totals by classification were: Non-residential, $5,045,541,000, down slightly less than 1 percent, compared with the same period of 1952; residential, $4,926,893,000, down 3 percent; and heavy engineering, $2,884,827,000, up 11 percent. Total awards for the month of September totaled $1,741,673,000, or 23 percent higher than August, but 15 percent below September, 1952. Individual September awards were: Non-residential, $783,266,000, up 43 percent over August, but 38 percent lower than September, 1952; residential, $507,430,000, down 2 percent from August and also 2 percent from the preceding September; heavy engineering, $450,977,000, up 25 percent over August and 82 percent over September, 1952.

* * * * * * * * * *

Boiler insurance rates have become a matter of concern to at least one member of the American Concrete Pipe Association. It seems that his rates for boiler pressure above 15 p.s.i. are double those below 15 p.s.i. Thinking the rates unfair, he protested to the insurance companies but gained no results. The association is attempting to find if this matter is a point of issue with other members, and if so is contemplating a protest for the entire industry.

* * * * * * * * * *

Glass fibers, which are finding increasing uses in many industries, have now invaded the building field, via gypsum wallboard products. Certain-teed Products Corp. is using Fiberglas reinforcing strands, in place of cellulose fibers, to strengthen the core of its gypsum, which reportedly produces a product with greater resistance to cracking and shattering, in addition to "better nailability." According to laboratory tests, the Fiberglas reinforced gypsum board has shown up to 80 percent greater shock resistance than conventional board, plus greater resiliency.

* * * * * * * * * *

Railroad construction expenditures for the first eight months of 1953, amounted to $298,000,000, compared with $270,000,000 for the same period in 1952, according to a recent joint announcement by the Labor and Commerce departments. The August, 1953, figure was estimated at $44,000,000, against $43,000,000 in July, and $33,000,000 in August, 1952.

* * * * * * * * * *

A new synthetic mineral, resembling mica in appearance, but considerably harder, has been discovered by Norton Co., Worcester, Mass., as recently reported by The Wall Street Journal. By simulating roughly the same conditions of pressure and temperature which nature uses to form the rocks of the earth's crust, a crystallized silica has been produced which is much harder and a fourth more dense than ordinary quartz. It is said to be about as hard as garnet or topaz. The new rock was formed by putting various substances containing silicon and oxygen under a pressure of 35,000 atmospheres (about 514,500 p.s.i.), at a temperature of 750 deg. C., and keeping it there for 15 hr. It was estimated that these particular conditions would be duplicated in nature only at about 60 mi. below the earth's surface. Commercial possibilities of the mineral have yet to be explored, but it has been predicted it might find use as a specialized abrasive.

* * * * * * * * * *

Steel production, as reported in "Steel Facts," in the first six months of 1953 was at the rate of about 116,000,000 tons annually, exceeding the previous record, set in 1951, by about 11,000,000 tons. The monthly raw steel output increased by nearly 1,300,000 tons or almost 16 percent between the Korean attack in June, 1950, and mid-1953.

WE HEAR

An Austrian firm has developed a new compound used in producing super-high temperatures needed for many industrial processes, according to a recent report in The Wall Street Journal. Called molybdenum di-silicide, it would be used to make the wires that provide heating elements for the hottest electric furnaces. The developer of the product believes it may mean important advances in such fields as the making of ceramics and glass and the processing of those newer metals that can only be melted by the highest temperatures. It is said to withstand temperatures of 3000 deg. F., compared to present substances such as silicon carbide which cannot take much more than 2400 deg. Pure molybdenum wires are sometimes used to work up temperatures of 36,000 deg., but to do so they have to be operated in a vacuum. With the new compound, the vacuum isn't needed as the material resists oxygen and thus can't burn out. Molybdenum di-silicide is made by combining molybdenum and silica by means of powder metallurgy.

* * * * * * * * * *

After a slight decline in September from the all-time high in construction costs reached in August, construction costs advanced slightly again in October, as reported by Engineering News-Record. Scattered wage increases, plus a boost in cement prices for one city, off-set further declines in lumber prices. The Construction Cost Index for October was 610.76 (based on 1913=100), a 0.1 percent increase from September, but 0.2 percent below the record high of August. The Building Cost Index for October was 436.31 (also a 1913 base), or 0.05 percent above September, and slightly below the August figure.

* * * * * * * * * *

The tusk of a mastodon which roamed the earth some 100 to 200 centuries ago was recently unearthed during gravel excavating operations near Elkhart, Ind. The tusk measured 40 in. along the outside arc and 5 in. thick at the larger end, although about 1 ft. reportedly had been broken off. Although disposition of the tusk had not been made, it was indicated that it would probably be given to the department of paleontology of the University of Michigan.

* * * * * * * * * *

A new paving process, which reportedly could revolutionize hard-surface construction, has been developed in Germany. Already under test in Germany and other western European countries, the process is currently being given its first North American try-out by the New Brunswick government. According to the sponsors, the process, which involves a special mixture designed to free pavements of ice, can be mixed with concrete and used in concrete paving on highways, airport runs and sidewalks, or in asphalt hard-surfacing. It is also claimed that either the concrete or asphalt mixture can be used in patching, or superimposed on old paving. Several small-scale tests in Germany are said to have proved successful, and other tests are underway in France, Italy, Sweden and Finland.

* * * * * * * * * *

Plant neighbors are getting tougher and tougher on local industries. The news is full of complaints about dust, vibration, etc., etc., and now we have a case where residents near a cement plant complained about the noise from shooting out slag rings in the kilns. The result? The cement plant now uses guns with silencers.

* * * * * * * * * *

Freight car deliveries in September totaled 5706, partially filling a backlog of 42,198 cars on order as of October 1. Orders for 3914 freight cars were placed by the railroads in September alone.

* * * * * * * * * *

Heavy construction awards, nationally, totaled $12,507,291,000 for the first 43 weeks of 1953, as reported by Engineering News-Record. This was a decrease of 7 percent from the $13,425,530,000 construction awards for the corresponding 1952 period, but still the second highest volume on record.

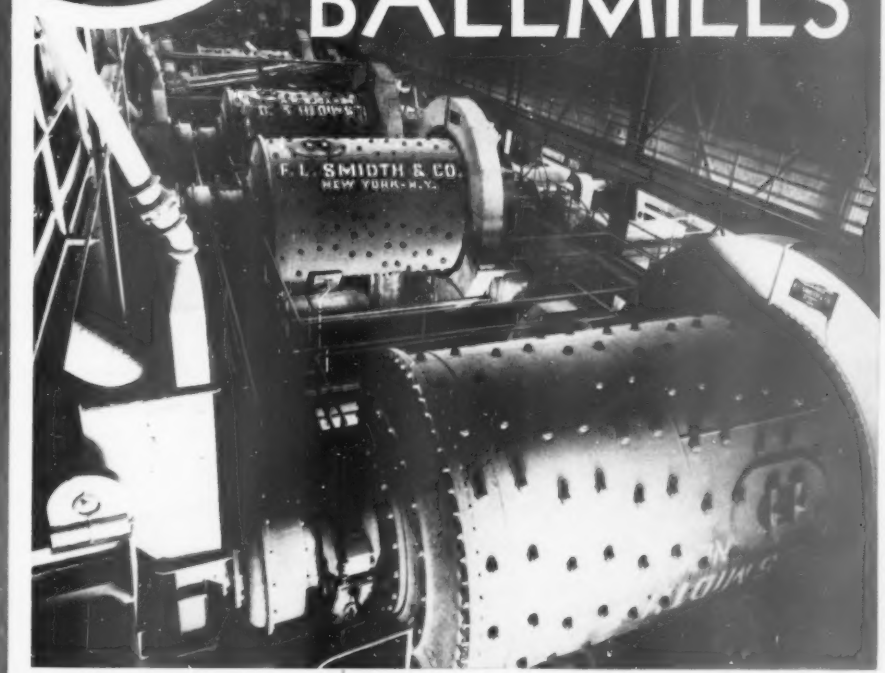
* * * * * * * * * *

Two highway projects, costing an estimated $350,000,000 to $425,000,000, are being studied by the Detroit Highway Turnpike Authority. Engineering studies are currently being conducted on a proposed turnpike from Detroit northwest to the Saginaw-Bay City area, a distance of approximately 100 miles. The second project will be a turnpike westward from Detroit, across Michigan, and meeting the proposed Indiana turnpike. The second highway would be 200 miles long.

THE EDITORS

SMIDTH

BALLMILLS



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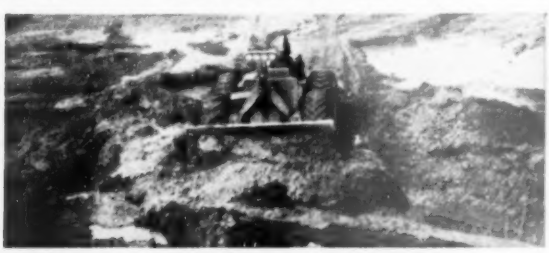
Pictures of the month... *by LeTourneau-Westinghouse...*

HAULS 50 TONS PER LOAD — Diamond T Stripping Company of Philipsburg, Pa, moves 7000 yds of overburden per 16-hour day with 2 Model "A" Tournarockers. These giant Rear-Dumps haul 50 tons of the blasted rock per trip. They are loaded by a 6-yd Lima shovel. Operators control Tournarockers easily . . . just push an electric switch to steer or dump . . . flick a small lever to change gears. No wrestling bulky levers . . . no clutching needed. Photos show stripping from a Class D seam of coal.

STRIPS 66 PAY YDS PER HR — Georgia Lime Rock Company works this D Tournapull 12 months a year to strip 3 to 30 ft of low-grade Fuller's earth. Because of its speed, one-man "D" alone uncovers enough lime rock to keep the plant busy. In typical operation, "D" loads 5½ bank yds in 25 seconds. Output averages 66 to 71 bank yds hourly over 1800 ft cycles.



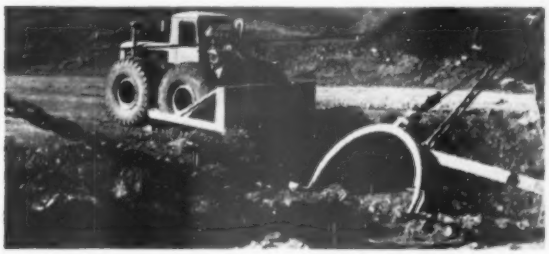
99% EFFICIENT — $56.80! That's all Bill Ward has spent for repairs on his 2 Tournatractors — one 2 years old; the other, 3 months! Used mainly on mine-maintenance-type jobs, both units have been 99% mechanically efficient. They drive everywhere without planking. Main assignments: pulling 45-ton trailer, maintaining access roads, leveling dumps, grading parking areas, stockpiling coal.

CLEARS FLOODED GRAVEL PIT — Big low-pressure tires give Gil Wyner's Tournatractor ample flotation for clearing muck from this rain-flooded gravel pit near Gloucester, Massachusetts. Unit also handles shovel clean-up, miscellaneous odd jobs. Travel between assignments is made under own power . . . Tournatractor drives everywhere at speeds up to 19 mph.

(Advertisement)

. . . with performance reports from around the world

4 MILES FROM ARCTIC CIRCLE — At Jumisko, Finland, 6 Tournarockers are hauling 400,000 yds of granite to excavate 4 miles of tunnels for water power. Winter temperatures drop to 40° below, but units operate 24 hours a day. With 13 ft 9 in. turn radius, they maneuver easily in the 20 ft tunnels.



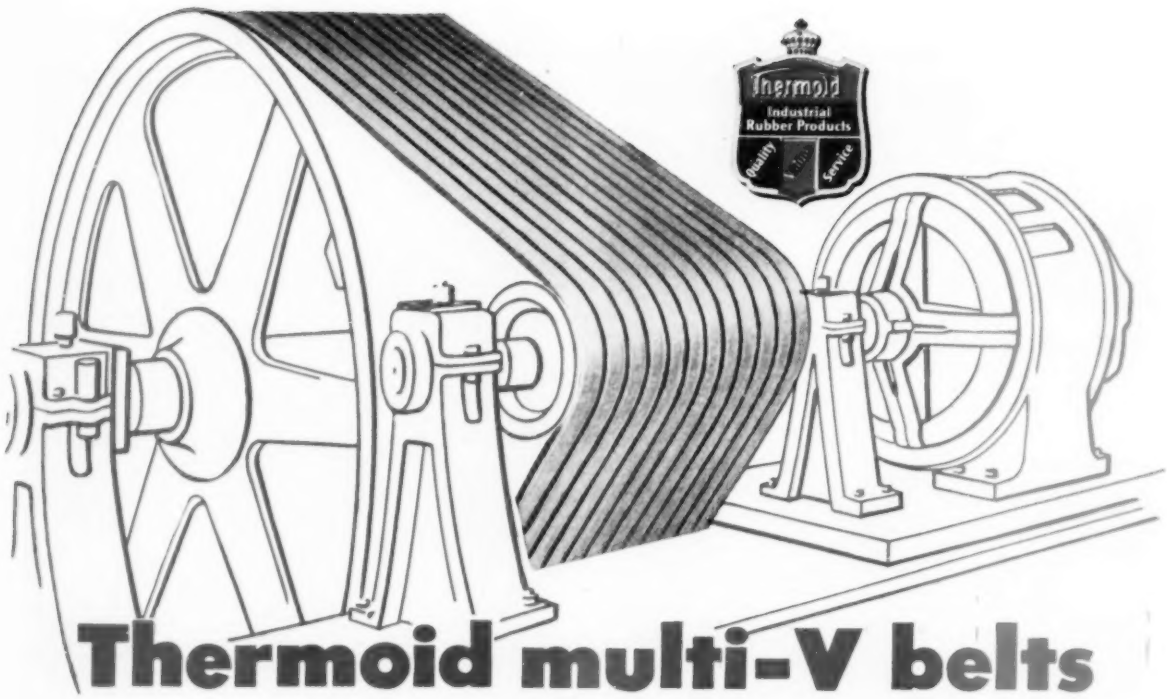
WORKS IN ABRASIVE MATERIAL — Westmoreland Manganese Corp, Batesville, Arkansas, works their Tournatractor in material so abrasive that dragline teeth must be replaced every 8 hrs. This set of tires, retreaded once, still has 45% of tread left after over 1000 hrs of use. Unit cleans clay and flint rock from around 2½-yd shovel and 5-yd dragline.

ECONOMICAL ON 700 FT PUSH — Replacing 2 crawler-tractors for Marietta Concrete Corp, Ohio, Tournatractor pushes sand and gravel 50 to 700 ft to dragline for loading. Because this unit dozes at 3½ to 8 mph, it equals output of both big crawlers which could work no faster than 1 to 2 mph.

TIRES OUTLAST TRACKS, 4 TO 1 — Because tracks on their crawler had to be replaced every 650 to 900 hrs, Miami Crushed Stone Co, Florida, bought this Tournatractor for stockpiling, other odd jobs. In 9 months, Tournatractor worked 3800 hrs — still had original tires. In 12 months, their crawler worked only 2600 hrs. Crawler lost hours for track repair; was often idle because it could not economically handle scattered jobs. Frequently, Tournatractor could get to job, do work, and return before crawler could travel ¼ mi. Tournatractor also boosted production . . . pushing sand 150 ft, it delivered 2 loads to crawler's 1. For more information on Tournatractor or other tools, write LeTourneau-Westinghouse Company, Peoria, Ill.

(Advertisement)

Tournapull, Tournarocker—Trademark Reg. U.S. Pat. Off. Tournatractor—Trademark Pic-524-M



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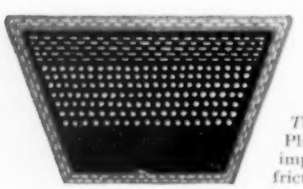
When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

They're built to take it—specially designed to resist internal friction and heat.

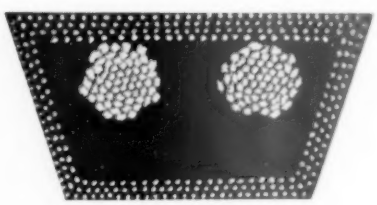
Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

It pays to specify Thermoid.



Thermoid A, B and C Sections Plied cord construction, latex impregnated to reduce internal friction and heat build up.

Thermoid D and E Sections Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.



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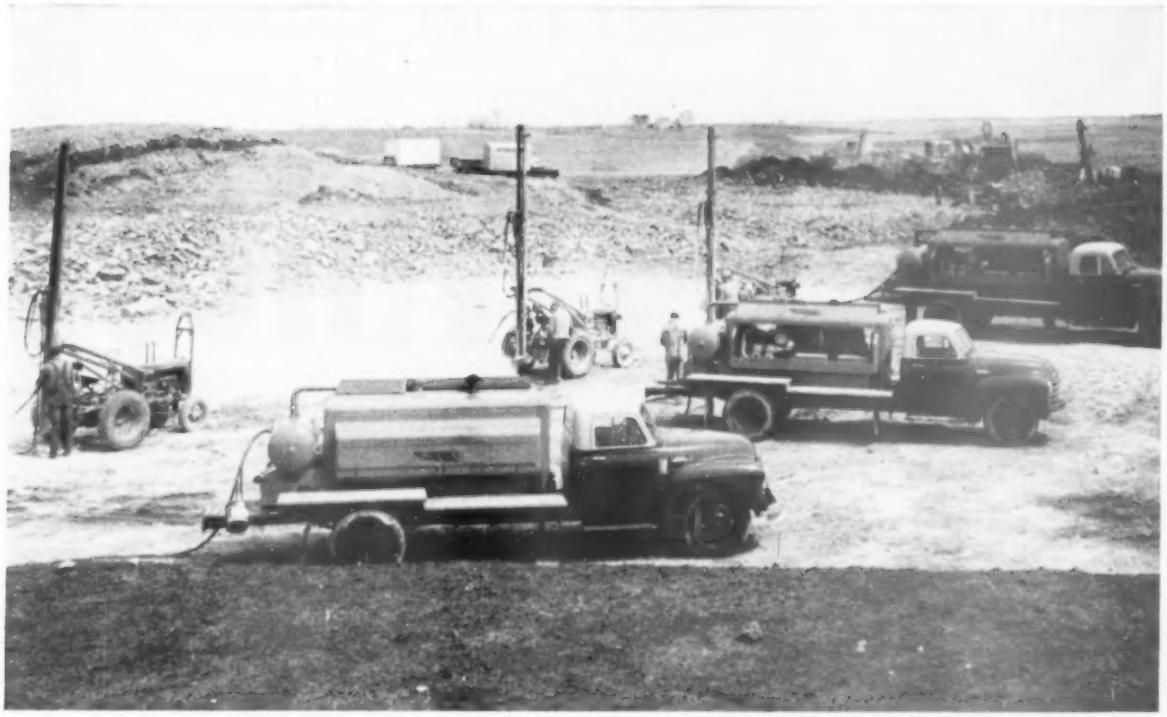
Jaeger-Air now speeds operation



the fastest drilling team on wheels

Motorized for rapid movement. Each drill powered with 365 cu. ft. of air for top speed drilling and blowing

To work his 20 quarries, widely spread over five counties, Perry Jones, Carbondale, Kansas contractor and quarryman, devised this motorized fleet. The Jaeger "new standard" 365 ft. compressors are on Model 6500 Chevrolet trucks. The Thor 4" wagon drills, with enough mast for 12 ft. steel change, are on Case tractors.

Each compressor, with its drill, is a self-sufficient mobile unit, permitting the most flexible use of the equipment.

Rock ledges vary in depth up to 23 ft. The additional air delivered by the 365 ft. Jaeger compressors makes it possible to hold full 90 to 100 lbs. pressure at the tools for maximum efficiency in both the drilling and the hard blowing required. The 315 ft. compressors, previously used, could not maintain this full pressure.

Other Jaeger "new standard" capacities — 75 - 125 - 135 - 250 - 600 cfm — offer comparable opportunities to get greater production without increasing costs. See your Jaeger distributor, or send for Catalog JC-1.

"I am now operating my seventh consecutive Jaeger 'Air Plus' Compressor. This speaks for itself as to my opinion of the design and superior performance of these machines."

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Promotes Safety . . . Simplifies Secondary Blasting in Southern Limestone Quarry

Du Pont CD-48 Blasting Machine.

BEFORE FIRING SHOT consisting of 400 block holes.

AFTER FIRING SHOT... easy digging for the shovel.

For greater safety and efficiency in firing secondary blasts, the Belgrade, North Carolina quarry of the Superior Stone Co. of Raleigh, North Carolina uses a Du Pont CD-48 (Condenser Discharge) Blasting Machine. It is desirable to fire as many "pop" shots as possible at one time, and one secondary blast may include up to 400 holes.

Such shots are purely routine with a Du Pont CD-48 Blasting Machine. Just connect the caps in parallel series, with about 40 caps in each series. This machine will actually fire 1,200 caps, and you do not need to erect and maintain any shooting lines about the quarry.

Du Pont CD Blasting Machines are now available in four sizes: CD-12, CD-24, CD-32 and CD-48. Their capacities range from 20 caps in straight series to 1,200 in parallel series. They fill the need for a lightweight, portable source of power and eliminate costly permanent shooting lines.

All CD Blasting Machines are characterized by (1) extremely high capacity for their weight and size, (2) absence of moving parts, (3) elimination of the human element of mechanical-type machines, (4) a test pilot light, and (5) a wiring and switching system with important safety features.

Ask the Du Pont Explosives representative in your area for complete information about this newly developed, much improved blasting machine. It may well be an accessory you can put to efficient use in your own quarry. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

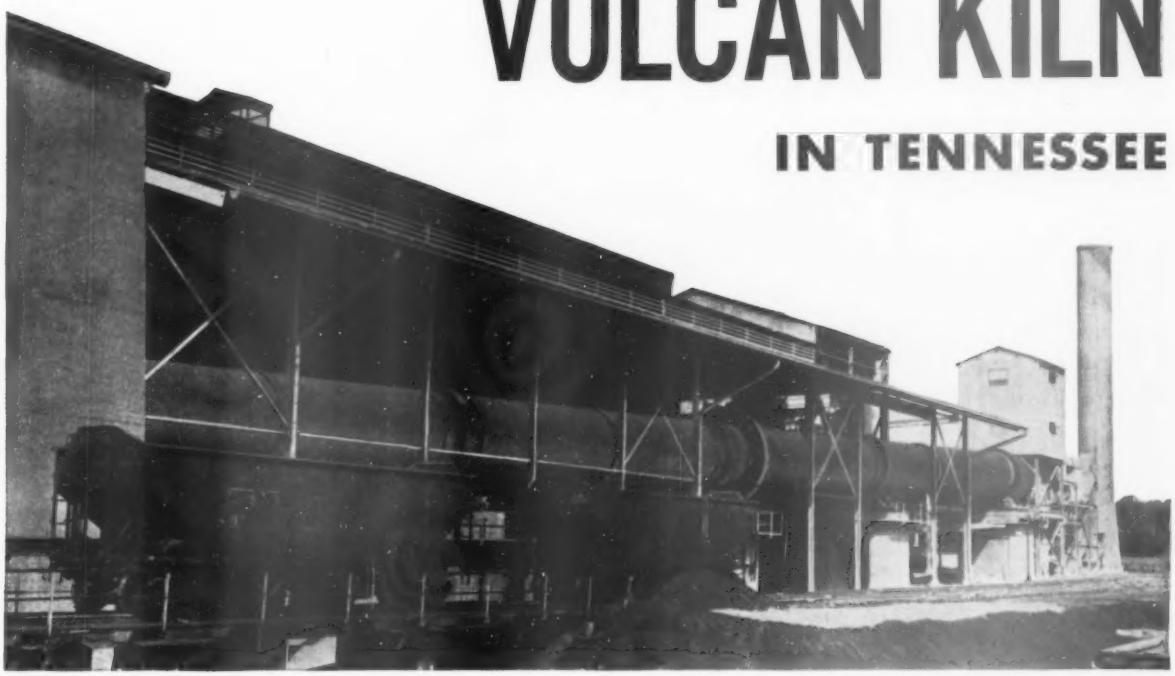
DU PONT EXPLOSIVES

Blasting Supplies and Accessories

DU PONT

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

ANOTHER VULCAN KILN IN TENNESSEE



Repeat orders are the surest indication of satisfactory service. In 1928 a well-known Tennessee cement company installed two Vulcan rotary kilns, each 10 feet x 215 feet, for manufacturing Portland cement by the wet process. During nearly a quarter-century of practically continuous operation these two kilns have given, and still give, such satisfactory service that another Vulcan kiln has recently been installed to provide 60% additional capacity.

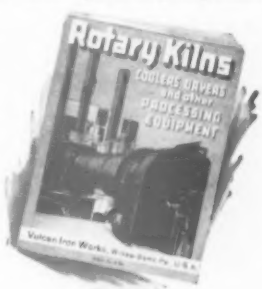
The new Vulcan kiln, shown above, is much longer (10 feet x 300 feet), thereby permitting higher overall efficiency and greater capacity. Other improved features include a heavily reinforced all-welded steel shell mounted on our latest-type supporting roller and thrust bearings; all of which are automatically lubricated and easily adjusted to compensate for wear and moderate misalignment.

The main drive unit is fully enclosed and the gasoline-engine auxiliary-drive unit is as fully enclosed as possible; to promote cleanliness and safety. Both drives provide an ample margin of power over any probable requirement and are designed for many years of trouble-free service.

Every part of every Vulcan Kiln is designed and built with an extra margin of protection against mechanical troubles of every kind and that's why long-time users often order additional units from us without competition. They know that any necessary difference in first cost will be repaid many times over in greater freedom from breakdowns, shutdowns, and other operating expense.

THIS BOOKLET TELLS WHY VULCAN KILNS ARE BETTER

and why they give more years of trouble-free service. Its 28 fully-illustrated pages are packed with specific information regarding the design and construction of Vulcan Rotary Kilns, Coolers, Dryers and other related products. No charge or obligation. Write for Bulletin No. A-442, giving name of your company.



Vulcan Iron Works

Established 1849

WILKES-BARRE, PA., U.S.A.

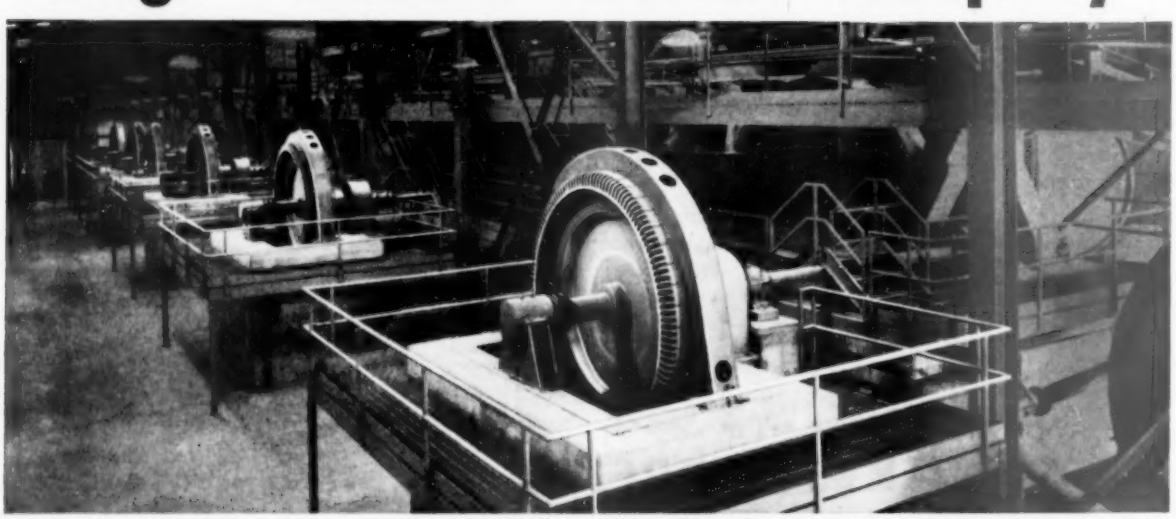
New York City Office, 50 Church Street

OTHER VULCAN PRODUCTS INCLUDE BRIQUETTING MACHINERY, ELECTRIC HOISTS, MINING MACHINERY, OPEN HEARTH STEEL CASTINGS, HEAVY SPECIAL MACHINERY AND ALL TYPES OF MODERN INDUSTRIAL LOCOMOTIVES. BULLETINS ON REQUEST.

GE ENGINEERING REPORTS:

1 **ON-THE-SPOT SEPARATION** is done on this barge, which floats in a man-made pond near the Bunnell plant. Walking dragline (in background) dumps sand containing coquina shell into bins. These are five of twelve totally enclosed fan-cooled G-E Tri-Clad* gear-motors that keep conveyor loads moving to the screening process—in this corrosive atmosphere.

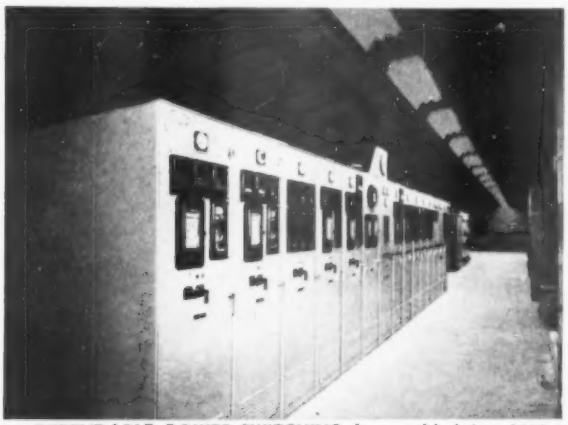
Lehigh Portland Cement Company's



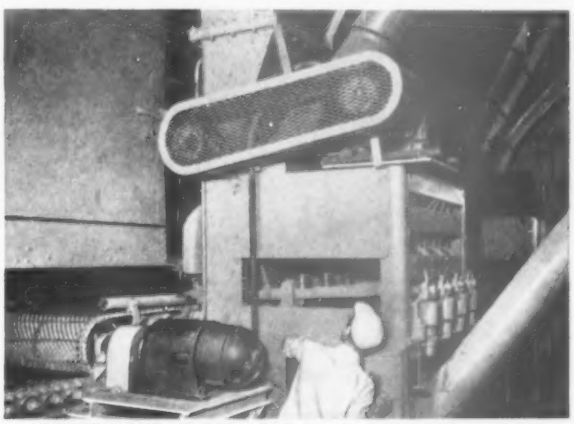
2 **HIGH POWER FACTOR** helps plant operate economically. Three of these 700-hp, 180-rpm, 4000-volt synchronous motors drive primary wet ball mills that pulverize raw material; three others grind cement clinker after burning.

3 **KILN-SPEED CONTROL** over wide range is made possible by G-E adjustable-voltage d-c drives. Each kiln uses a 125-hp motor, and an electrically co-ordinated feeder motor.

4 **RELIABLE POWER SUPPLY** for kiln drives includes G-E 1000-kva load-center substation, two G-E synchronous m-g sets, and a-c and d-c control (background).



5 **DEPENDABLE POWER-SWITCHING** is provided by 4160-v metal-clad switchgear in a pressure-ventilated room. Vertical-lift design means you *see* when breaker is disconnected.



6 **CONTINUOUS FLOW** of finished cement through packhouse is aided by this G-E Tri-Clad motor driving bagging machine, and gear-motor driving conveyor for bagged cement.

*Reg. trade-mark of General Electric Company

new plant powered by G-E system

G-E drives help maintain fast, smooth output of coquina-shell Portland cement

To help relieve the prevailing cement shortage in Florida, the Bunnell plant of the Lehigh Portland Cement Company has been completed with a production capacity of 4000 barrels a day. Here, for the first time in the U.S., coquina shell is being used in the manufacture of Portland cement.

In cooperation with F. L. Smidth & Co. engineers, General Electric cement industry application engineers developed a complete electrical system integrated with each plant process to facilitate a smooth-flowing, continuous operation. Each step, carefully linked with an efficient materials-handling system, is powered and controlled by G-E drives. Success of this coordinated planning is evident with today's fast-moving production flow.

REACH PEAK EFFICIENCY THROUGH ELECTRIFICATION

Use G-E engineering aid early in your electrical modernization planning to avoid production bottlenecks, assure optimum output. Contact your G-E Apparatus Sales Office for Bulletin GEA-5748 or write to General Electric, Section 658-13, Schenectady 5, New York.

Engineered Electrical Systems for the Rock Products Industry

GENERAL ELECTRIC

Want Proof?

then trust your own eyes!

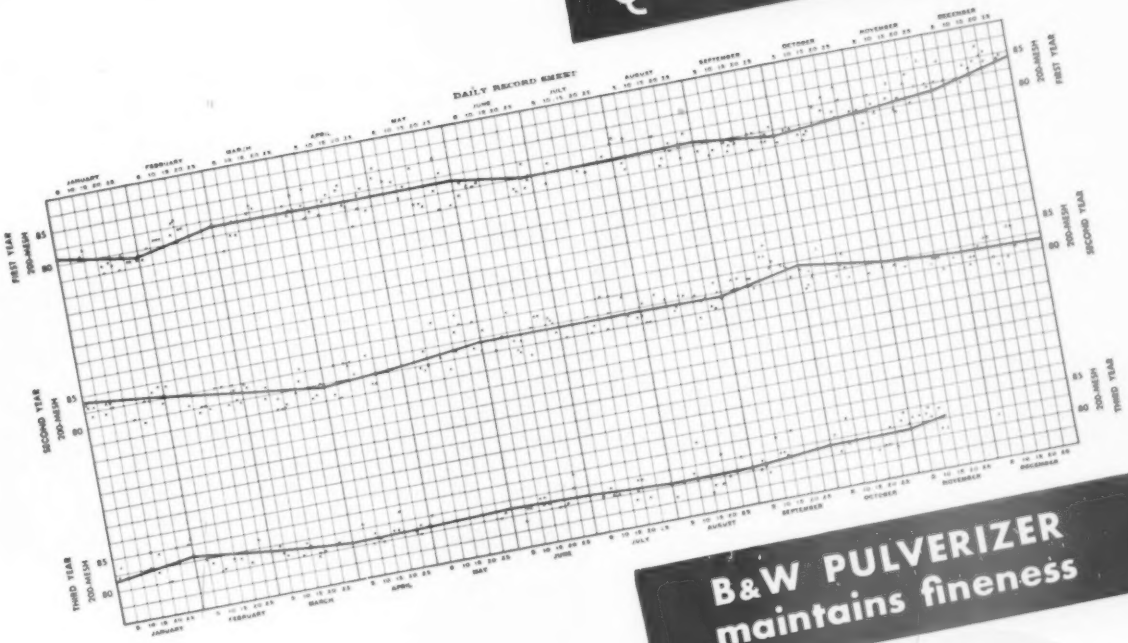
And you will know that Bemis color printing of brands on multiwall paper bags is bright, crisp, color-true . . . the kind that will boost the selling power of *your* brand.

Ask your Bemis Man to show you typical Bemis multiwall printing. Trust your own eyes.

Bemis

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

QUALITY CONTROL



B&W PULVERIZER maintains fineness

Chart shows record of a B&W Type E Pulverizer over a three-year period. The Babcock & Wilcox Company, Boiler Division, Process Equipment Department, 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

C-205

A 20' long, 11'6" wide nodulizer section of a 10' x 150' Rotary Kiln ready for shipment from the Standard plant.

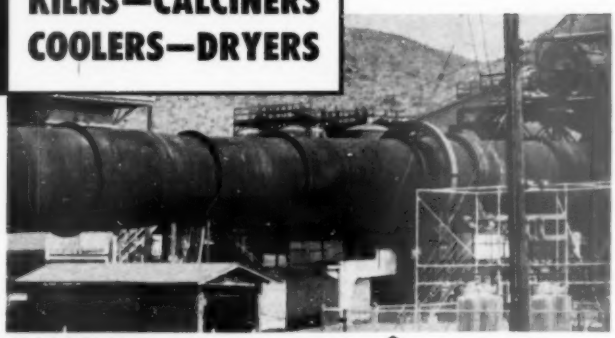
L-O-N-G ON RUGGEDNESS

STANDARD **KILNS—CALCINERS COOLERS—DRYERS**

The illustrations shown here give added proof of the time-tested slogan—"It Pays to STANDARD-IZE". Here is just another example of Standard's ability to produce *rugged* rotary equipment for *any* job, large or small.

From all over the country—North, East, South, West — whenever the need is for dependability—the call is for Standard. See for yourself why the list of satisfied Standard users grows every day.

With over 50 years of precision engineering behind it, Standard is ready to help solve your problems—here or abroad. Write today for the complete Standard Story.



A small section of the kiln, installed and in use at a large western manganese company.

A close-up view of the same kiln. Note the solid construction. Standard Kilns are built to last.

STANDARD STEEL CORPORATION

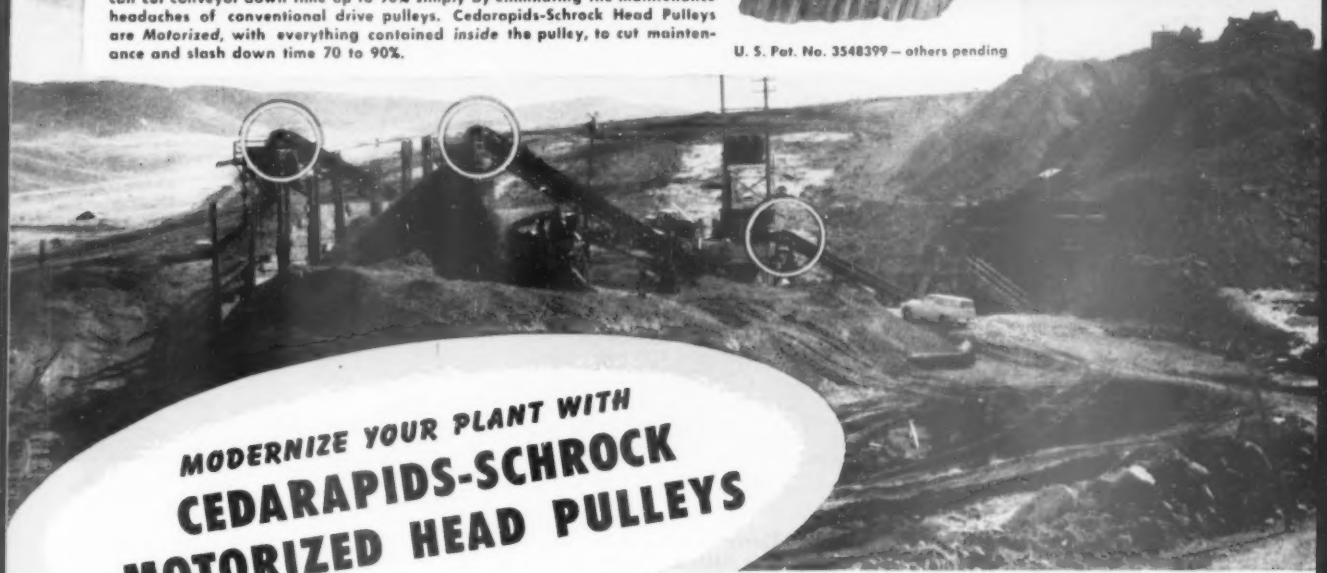
5036 Boyle Avenue, Los Angeles 58 • 7 East 42nd Street, New York 36

SLASH CONVEYOR DOWN TIME 70 to 90%

HUNDREDS OF INDUSTRIES ARE SAVING MONEY WITH CEDARAPIDS-SCHROCK *MOTORIZED* HEAD PULLEYS

If you use belt conveyors or belt-bucket elevators in your installations, you can cut conveyor down time up to 90% simply by eliminating the maintenance headaches of conventional drive pulleys. Cedarapids-Schrock Head Pulleys are *Motorized*, with everything contained *inside* the pulley, to cut maintenance and slash down time 70 to 90%.

U. S. Pat. No. 3548399 — others pending



MODERNIZE YOUR PLANT WITH CEDARAPIDS-SCHROCK MOTORIZED HEAD PULLEYS

A typical example of Motorized Head Pulleys in one industry where conveyors are used is this completely electrified, all-Cedarapids aggregate producing plant where all conveyors are equipped with Cedarapids-Schrock Motorized Head Pulleys. Three of the Head Pulley installations are shown in the circles.

✓ **No chains, sprockets, sheaves out in the weather and dirt!**

No chain idlers to keep adjusted and oiled!

No V-belts to adjust or replace!

No shafts and drives to service and lubricate!

No motors exposed to damage or weather!

No protruding parts which can be accidentally hit and damaged, or catch workmen's clothes!

✓ **All moving parts . . . electric motor, reduction gears . . . *are contained within the pulley!* Maintenance headaches with countershafts, speed reducers, sprockets, chains, Universal drive shafts and other parts necessary with conventional conveyor drives are eliminated!**

✓ **Cedarapids-Schrock Motorized Head Pulleys pay for themselves in a short time! In the long run, the reduced maintenance and down time made possible by the use of Motorized Head Pulleys enable you to modernize your plant at little or no cost! There is no other pulley like it!**

THE next time you're down for weather, or between jobs, or shut down for any reason, *provide for future cuts in maintenance costs* by modernizing your plant. Remember . . . every minute of down time costs you money!

Cedarapids-Schrock *Motorized* Head Pulleys are the revolutionary, modern way of cutting down time and eliminating expensive upkeep on all belt conveyor or belt-bucket elevator operations.

All moving parts are inside the pulley, enclosed and protected by the pulley shell from weather, dirt and damage. Operation is simple . . . the pulley shell rotates around the electric motor and reduction gears, which are held stationary by a torque arm attached to the conveyor frame.

More and more industries are modernizing their plants with these compact, flexible, easy to install Motorized Head Pulleys, and report they pay for themselves in a short time in reduced maintenance and down time. Ask your nearest Cedarapids distributor for details, or write for Bulletin MP-1 today.

Cedarapids — Built by IOWA

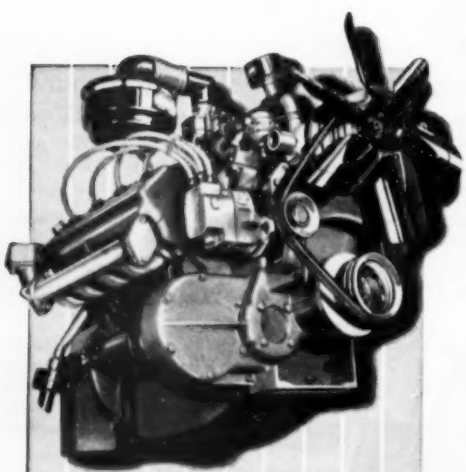
Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by YUBA MANUFACTURING CO., (Pulley and Sprocket Department) Benicia, Calif.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

Photo courtesy Hale Fire Pump Company, Conshohocken, Pa.

Chrysler Power provides modern solution to age-old problem of irrigation



Early last summer, the owner of this 640-acre farm near Williamsburg, Virginia, decided to irrigate 120 acres. Taking his water from the nearby James River, he irrigated 70 acres of corn, 50 acres of soy beans. Water was pumped at the rate of 960 gallons per minute, fourteen hours a day, seven days a week. Each acre required approximately 36,000 gallons.

The results were astounding. Not only did this farmer save his crops during an especially dry summer, but his corn and soy bean yields actually *increased* 100% over the year before. In each case, 1952 was considered a normal year.

What this farmer did with his Hale Model CIRV Pump demonstrates again the effectiveness of Chrysler Power. Here the 331-cubic-inch displacement Model 20 V-8 Engine is used because the manufacturer wants great power with light weight, continuous, economical operation.

Manufacturers find Chrysler Engines ideal for almost any equipment requiring extra power without extra weight. Manufacturers also find they can order engines equipped *by Chrysler* to meet the needs of the equipment and their customers. For example, Chrysler Engines can be supplied with gasoline, natural or liquid propane gas burning carburetors, standard or gear-driven front ends, 12 or 24 volt electrical system.

Chrysler Industrial Engines are not expensive. Production line methods, adapted to specialized industrial engine building, provide a custom-built engine at mass-production prices. See a Chrysler Industrial Engine Dealer, or write: ***Dept. 1311, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER
Industrial Engines

HORSEPOWER WITH A PEDIGREE

PAYLOADER *WORKS ANYWHERE*

4-WHEEL DRIVE GIVES TRACTION, MOBILITY AND VERSATILITY!

Load! Dig! Strip! Carry! Stockpile! Lift! Pull! Push! — all these operations are everyday tasks for big versatile "PAYLOADERS" — makes them valuable for small or large operations. Their mobility and travel speed up to 20 mph enables them to travel quickly between scattered jobs.

These "PAYLOADERS" feature large pneumatic tires, 4-wheel-drive, proper weight distribution and power-boosted steer. Other outstanding advantages are full, double-acting hydraulic bucket control, automatic tip-back bucket and four speeds in *both* directions. Sales *and* service are available from 200 "PAYLOADER" Distributors in the U. S. and Canada. See yours for full details or write The Frank G. Hough Co., 705 Sunnyside Ave., Libertyville, Ill.

CATALOGS are available on any "PAYLOADER": 4-wheel-drive Models HM — 1½ cu. yd. and HR — 1 cu. yd.; rear-wheel drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; front-wheel-drive Models HAH — ½ yd., HA — ½ cu. yd.

Power-boosted steer for easy handling in sand and mud

Big tires and 4-wheel-drive for traction and flotation

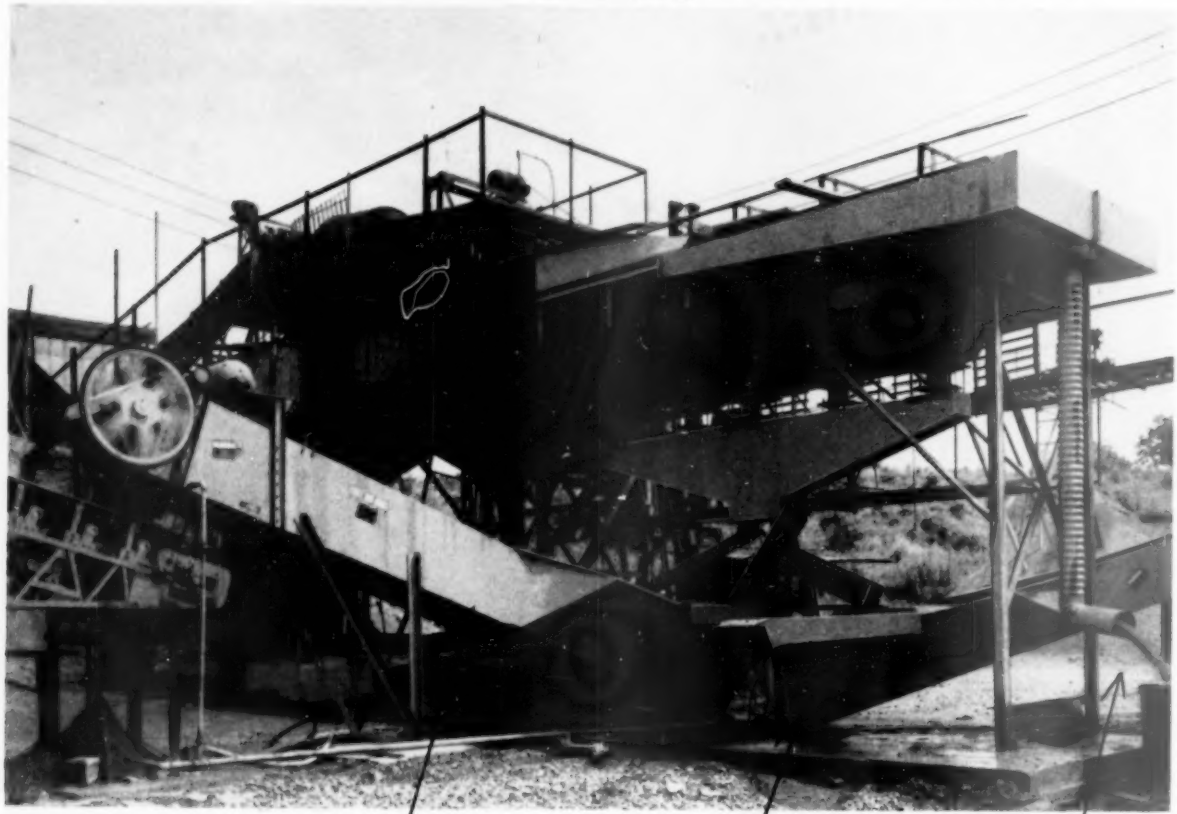
Travel Speeds up to 20 MPH

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. · Since 1920

Clean, classified sand is simple as A B C at Sand & Gravel Supply Co. CONNEAUT LAKE PENNA.



A CLEAN CONCRETE SAND

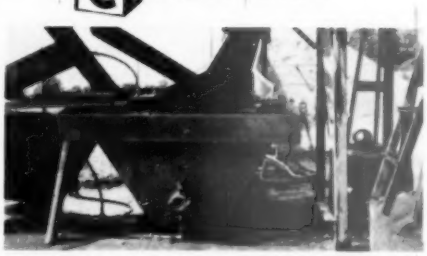
B CLEAN MASON SAND

C EXCESS WATER

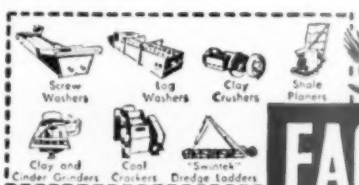
Eagle Screw Washers in conjunction with an Eagle 20' Water Scalping Tank provide required gradations of clean sand at this neat, compact plant.

The Water Scalping Tank removes excess water and provides preliminary classification—coarse sand settling at the feed-in end (left) and fine sand at the overflow end (right). The dual compartment collecting flume below the water scalping tank permits coarse sand to be chuted to a 30" x 25' Eagle Single Screw Fine Material Washer-Classifier-Dehydrator with adjustable long weir—here clean, premium concrete sand is produced. Fine sand from the other compartment flows down split chute, part going to the Concrete Sand washer and part to a 20" x 25' Eagle Single Screw washer which produces Mason Sand. Ratio of fine and coarse material in the Concrete Sand readily meets specifications.

IT'S EASIER TO DO BUSINESS AND MAKE PROFITS WITH EAGLE EQUIPMENT ON YOUR TEAM! SEND FOR THE FACTS TODAY!



Dual Compartment Collecting Flume below Eagle Water Scalping Tank and "split" fine sand chute at left assure Concrete Sand to exact specifications at this plant.



LEADERS IN AGGREGATE WASHING AND CLASSIFYING EQUIPMENT FOR HALF A CENTURY

EAGLE IRON WORKS

137 Holcomb Ave., Des Moines, Iowa

Letting the Customer in on Production Problems

AN INNOVATION at the Birmingham, Alabama, operating meeting of the National Lime Association, reported in this issue, was a panel discussion led by top technical personnel of companies representative of large users of lime. These men represented the building, metallurgical, paper and chemical industries.

Each member of the panel set forth his company's or industry's specifications for lime according to application, the reasons for the physical and chemical requirements, and gave some indications as to trends in their desires. Requirements for lime evidently will continue to become more rigid, which may involve careful selection of stone in some cases and more emphasis on regulation of plant operations for control of quality.

These talks and subsequent discussion by lime plant operating men presented an unusual opportunity for the producer and the consumer to gain a fuller appreciation of each others' problems. It was the kind of session that might well be emulated by other associations in their efforts to arrange programs that will be really useful.

Too often, those charged with responsibility for producing a material like aggregates or lime, or any other product, have a tendency to belittle customer specifications as being unrealistic or arbitrary. It is true that they often are, but that isn't always so. Knowledge of why a customer requires certain properties in the materials he buys, in order to meet his production or quality problems, can be very helpful to the supplier. Mutual discussion of problems confronting the producer, on the other hand, can also be effective in working toward realistic specifications.

At Birmingham, immediately following the panel discussion by consumer experts, came the report by Prof. J. A. Murray covering the fundamental research program on lime at Massachusetts Institute of Technology. Prof. Murray's report could not have been better timed, and his findings certainly must have been revealing to the lime users in the meeting and also to producers.

This research on lime burning and the properties of lime is bringing out some very useful information to guide the plant operator, and some facts which should be carefully considered by those who write specifications.

A large number of limestones from various lime plant quarries and mines have been calcined at four established temperatures under closely controlled conditions and the resulting limes carefully studied. Shrinkage determinations have been made as a measure of reactivity, and insoluble residue analyses to determine impurities.

The results have been surprising in some instances and, in others, have definitely pointed to limits in degree of hardness or softness of burning or reactivity beyond which producers using particular limestones cannot go in efforts to meet the requirements of some customers. Some limes of high impurities showed a high degree of reactivity when calcined at the lower temperatures whereas some of the purer ones showed low degree of reactivity when calcined at all temperatures. Other data revealed limitations that have pronounced effects on quality of lime.

Customer Education

These data brought out that limestones vary widely in their ability to be calcined into lime of specific properties. Some of the limitations disclosed need appreciation by those who write use specifications and who might otherwise not understand that geologic processes in the formation of limestones must be considered.

The research has also brought out that some producers can greatly improve their lime through careful control of calcination, and indicates that it is unsafe for a producer to predict results on the basis of a nearby plant's product. Prof. Murray urged that producers undertake plant experimentation, for much is yet to be learned and gained.

The matters of research and customer contacts are closely related. If a manufacturer or producer maintains customer contacts such as those at the lime meeting and if he knows as a result what the customer wants, and he has available a research department such as the National Lime Association has, probably supplemented by his own, he obviously is in good position to develop what the customer wants and thereby increase markets.

An official of Minnesota Mining and Manufacturing Co., which started out to crush roofing granules and has increased its sales volume thirty-nine fold since 1929, recently pointed up the value of research and customer contacts. He said that research marks the difference between growth and stagnation. Research is credited for the growth of his company, coupled with a policy of knowing the wants and timing research activities with the needs of customers.

Bror Nordberg

For the Removal of Waste
and Water from Sand
and Similar Materials

McLanahan SCREW WASHERS

are designed for long service life and lowest maintenance cost

McLanahan Screw Washers—thoroughly proven in service—provide the ultimate in equipment for the efficient, low cost removal of foreign material and water from sand or coarse materials.

These washers contain many outstanding features, including: antifriction bearings which are easily removed without disassembly—extra large settling area—enclosed reduction drive—flights are cast chilled alloy iron for extreme hardness and resistance to wear.

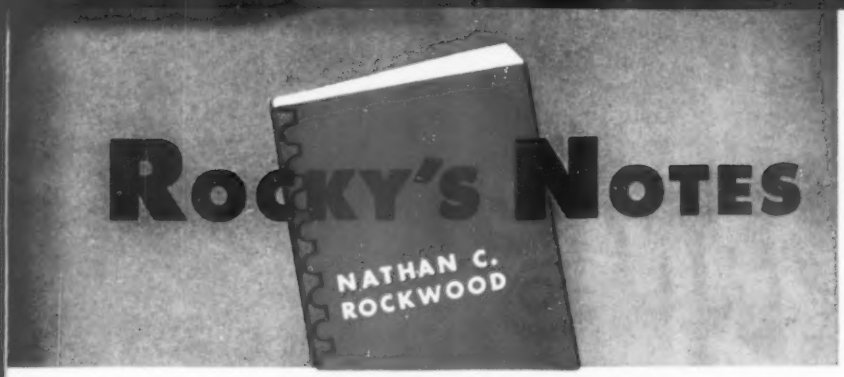
Washers are available in Single and Double Screw models illustrated—in 20′ and 25′ lengths dependent on moisture content and capacity desired. Investigate today!

Typical installations

McLANAHAN & STONE CORPORATION
Pit, Mine and Quarry Equipment Headquarters Since 1835
Hollidaysburg, Pennsylvania

Write for Bulletin SW-953
This bulletin contains data and drawings on Single and Double Screw Washers. Write for your copy today!

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Ball Breakers, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Screw Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Sandlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.



Some Indications Not Too Good

THIS IS THE TIME of year when the majority of operations in these rock product industries are closing, or at least easing off for the winter season. Producers are looking back on what in general was a very satisfactory year—not quite so good as 1952, but profitwise still quite satisfactory. The question now arises, what shall we look forward to in 1954? From all indications at this writing, it will not be as good as 1953, yet few expect anything like a "recession" that may require more than preparation for keener competiton.

There have been many warnings of this approach of new as well as old competitive practices, that perhaps some operators had hoped would never appear again, but, apparently, even with the knowledge gained from experience of the 1930's depression and the subsequent New Deal, we have not learned, and probably never will learn, how to circumvent the laws of economics for so long as a generation. When the government, federal and local, mortgages its future income to buy present-day goods and services, be they essential or not, the time inevitably comes when that same future income is required to pay interest on the mortgage as well as current expenses, and none is left to buy for the extended future other things or services that we have come to consider essential to maintain "prosperity."

When we stop to consider that total private debt (individual and corporate) is even appreciably more than the 300-odd billion dollar total of all public debt (federal, state and local government) it does not take much cogitation to see that somewhere there must be an end of the rope of credit expansion. The New Deal, and Mr. Truman's extension of it, warded off the day of reckoning by constantly depreciating the value or purchasing power of the dollar. Hence, with the expectation of paying off one's easily acquired debts with less valuable dollars, there was universally a great temptation to go into debt, for the same reason, of course, that women flock to the bargain counter to buy things they do not need, but anticipate they may need. Labor liked the deception because it thought in terms of higher money wages; industry, or at least some industry, liked it because it meant cheap money to invest in permanent fixtures; government liked it because it thought that this scheme was winning the allegiance of non-thinking voters, and proving easier to carry its own debt. These government bureaucrats guessed wrong in 1952. The public had more common sense than it had been given credit for. Does it have the sense to stay with the problem until it is solved?

Real Statesmanship Required

A statesman is defined as one "having unusual ability or capacity to direct and handle affairs of great public importance." We believe that at last we have some genuine statesmen in the Federal Government, but statesmanship is not necessarily confined to government. It can and should exist in the ranks of labor and industry. At present there is little evidence of anything like statesmanship in organized labor, if the opinions of the labor-union bosses expressed in Labor Day oratory is any indication. George Meany, president of the American Federation of Labor said "inflation" must be stopped. Walter Reuther, president of the Congress of Industrial Organizations, talked about provision of enough "purchasing power" in the hands of the public to balance the country's great productive power. Both objectives are admirable, but they can not be achieved by constant depreciation of the dollar.

Since the cost of all commodities is eventually resolved in terms of cost of labor, the cost, and hence the price of all commodities and services, is merely a multiple of the cost of labor. This applies even to taxes of various kinds since these go to pay for services and commodities for which labor of one kind or another is required. If we are to have a dollar of stable purchasing power, obviously we must have stable wage and salary schedules, in which increases are justified only by greater productivity. Any other permanent increase in labor costs is bound sooner or later to end in disaster by upsetting one or two laws of economics that appear firmly established by experience.

One used to be able to raise his standard of living by the constant decrease in the prices of both necessities and luxuries, because with volume production and more or less stable labor costs, the cost of production steadily declined. This philosophy has apparently been permanently abandoned, with the idea that this increment of cost saving belonged to labor and not to the general public. The move was probably initiated to help establish a dollar of stable purchasing power. It hasn't done so because both labor and industry have failed to abide by this philosophy.

Conditions May Force Economies

There are numerous indications that we all shall soon be compelled to observe the laws of economics a little more closely. First, in our own industries a group of producers of sand, gravel and ready-mixed concrete, reporting around the table on this year's business and next year's prospects appeared to expect production as a whole to drop perhaps as much as 20 or 25 percent. To be sure, this change of pace is spotty; some sections of the country expect as much or more business in 1954 as in 1953. *Engineering News-Record*, for example, estimated in its October 1 issue that *heavy construction* would fall off in 1954 only about 2½ percent as compared with 1953. The anticipated losses are in federal public works, housing and industrial building. This analysis would thus account for the spotty character of anticipated business by our producers. Increases over 1953 business are predicted in highways and municipal public works.

Another indication of increasing stress is the rush of construction contractors to sew up as many jobs as they can handle. They anticipate that there will not be so many jobs let next year. So, inspite of mounting construction-labor wage rates, and no reduction in material prices, bids on much public work are on the down grade, for the first time in several years. A recent survey by the *Wall Street Journal* showed typical bids 3 to 5 percent below the peaks of a year or so ago. Up to this point the *Journal* editors conclude that contractors are merely squeezing their profits, but obviously that step is only the preliminary one in the coming fight for business.

Some of the cement companies have provided another indication. The U.S. Steel Corp. has announced a policy of meeting competitors' prices by absorption of freight charges, which, done in good faith, has now been declared entirely legal. Presumably the Universal-Atlas Cement Co., as a part of the Steel Corporation, has adopted the same policy. A few cement companies have announced a sales policy which makes the same price to all users—dealers, contractors, ready-mixed concrete manufacturers and block manufacturers. Moreover, where such policy prevailed before, the user had to be able to take a railway car of cement at a time, now, with widespread truck deliveries, the user need take but 30 or 40 bbl. at a time to get the one-price advantage. Obviously, this will make the small contractor

(Continued on page 114)

"EUC" PERFORMANCE Pays Off IN MINES and QUARRIES

"Eucs" are designed and built for moving coal, rock, ore, overburden and heavy excavation at the lowest cost. The simple but rugged construction of Euclids, combined with large capacity, ample power and speed, provide efficient off-the-highway hauling of practically any material.

Euclids are standard equipment in many leading open pit mines and quarries, and on construction and industrial work. Owners know that Euclid staying power and continuous operation result in more loads hauled in less time at lower cost.

Ask your Euclid distributor for data on quarry or open pit jobs similar to yours. There is a Euclid to meet your requirements for off-the-highway hauling work.

Rear-Dump Euclids—Capacity from 10 to 34 tons—diesel engines from 125 to 400 h.p., spring mounted or semi-rigid drive axles—top speed loaded up to 35.7 m.p.h.

MORE LOADS PER HOUR— MORE PROFIT PER LOAD

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLID THE PIONEER

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

LABOR RELATIONS TRENDS

Teamsters' Union Is After Blood— New Groups Being Organized

By NATHAN C. ROCKWOOD

MANY PRODUCERS of sand, gravel, crushed stone and ready-mixed concrete are on record as opposed to federal legislation which would prohibit nation-wide union bargaining unless exception is made to industry-wide bargaining in metropolitan areas, where group contracts between associated producers and unions have been in successful operation for a number of years. Apparently, so far as the Teamsters' Union, under its new boss, Dave Beck, is concerned, these group contracts are to be used as stepping stones to nation-wide industry contracts. Another of his objectives is to take into his union warehousemen, clerks, taxi-drivers, in fact all connected with motor-vehicle operation in every industry; and some of these new recruits will be at the expense of other unions, which have already organized them.

The plans of the Teamsters' Union to organize many truck drivers not now unionized are contained in Beck's circular letter to his membership. One paragraph from this letter reads: "The problem of negotiating national agreements has been too long neglected by us; it is being initiated now by the Teamsters' organization in self-preservation. National agreements have been negotiated by other American Federation of Labor affiliates, also by the Congress of Industrial Organizations in such industries as steel, rubber, automobile and electrical manufacturing. These national agreements, particularly by the dual union, have harassed our general forward progress and definitely interfere with our organizing warehouse and other jurisdictions. In local, regional and national areas we are handicapped by the fact that we did not long ago recognize this evolution of business and negotiate in conformity with the changing structure of industrial expansion."

Organizing in Texas

On this page in our April issue we recorded a National Labor Relations Board decision ordering the Dallas Concrete Co. (ready-mixed concrete) to recognize the local Teamsters' Union as bargaining agent for its truck drivers on the strength of the Union's assertion that it had signed up 11 of 18 drivers, although the company charged that there was reasonable doubt that even these 11 were bona fide members. There was no election. Evidently that was merely the opening wedge for organization of all the ready-mix truck drivers in Dallas and Fort Worth, for on August 12, the N.L.R.B. decided a similar case against the Concrete Haulers, Inc., of Dallas and the Wamix, Inc. Although two separate corporations, because of the same ownership, these two were deemed one respondent. In all these Dallas cases, although no ready-mixed concrete was sold or delivered outside the state, the N.L.R.B. ruled it had jurisdiction because an annual business in excess of $50,000 was done and at least $25,000 of materials used in the business came from without the state. In the Concrete Haulers case, furnishing concrete to a contractor who did an interstate construction business was deemed sufficient to bring the concrete producer within the law.

Some of the facts in this case, taken from the record, are as follows:

"On May 25, 1951, the union secured the signatures of eight of the employer's 14 truck drivers. The next day the union informed the employer that it represented a majority of the truck drivers and desired to negotiate a contract covering these drivers. In response to the union's offer to exhibit the signed cards, the employer stated that he did not doubt the union's majority but asked for additional time to consider the union's bargaining request.

"At the next meeting on June 6, 1951, the employer declined to negotiate a contract for the asserted reason that his attorney had advised him that it was illegal to sign a contract. Although the union again offered to prove its majority, the employer reiterated that he did not doubt that the union 'had the drivers,' that wasn't the question, that his attorney said it was illegal to sign a contract.

"Before the drivers began work on the following morning, the employer delivered a speech to them in which he stated that he was under no legal obligation to enter into a contract with the union, adding for the first time that he was not convinced that the union represented a majority. At the conclusion of the speech, he requested the drivers to go to work. The eight drivers who had signed union authorization cards refused to do so and later went on strike in protest against the employer's refusal to bargain.

"The respondent contends that he was justified in refusal to bargain with the union because of his good faith doubt as to the union's claim of majority in an appropriate unit.

"It appears that underlying the respondent's contention is the disagreement with the trial examiner's resolution of conflicting testimony. As the trial examiner had the benefit of personal observation of the witnesses, and as his credibility findings are not inconsistent with the clear preponderance of all the relevant evidence, we see no reason to disturb these findings. However, were we to accept the respondent's version of his June 7 meeting with the union representatives, where the respondent, by his own admission, sought to raise the question of the union's majority status for the first time, we would not be persuaded that he did so in good faith. For, not only does the respondent not assert that he questioned the union's majority at their earlier meetings or conversations with the union, but also, if he had any such doubt, it should have been dispelled by the fact that a majority of the drivers had refused to heed the employer's request to go to work following his speech to them.

"The employer's intention in speaking to his employes was to inform them that he would not deal with the union. It was logical for him to inform them that employment would continue 'under the same circumstances' and to ask them to begin work within 15 minutes or indicate an unwillingness to do so.

"In a conference with union officials which followed his speech to the employes, the employer was accused by the union officials of locking out the men. He denied this accusation at the time stating that the employes 'should be working right now.' The employes later went on strike in protest against the employer's refusal to bargain with the union and became unfair labor practice strikers.

"The evidence does not support a finding that the employer would not permit them to 'punch in' for work, or that he told them to return to work in 15 minutes or turn in their uniforms.

"Order: Cease and desist from refusing to bargain with union; interference found herein, or in any other manner interfering with employes' self-organizational rights. Upon request, bargain with union; upon application, offer reinstatement with back pay to four employes who have not previously applied for reinstatement; post notice.

"Complaint is dismissed in so far as it alleges that the employer locked out or unlawfully discharged any employes."

New Board May Differ

That the personnel of the N.L.R.B. which made these rulings is generally regarded as having been prolabor throughout its life seems to be the accepted opinion in industry. While the

(Continued on page 119)

WHICH OF THESE 4 OPERATIONS IS YOUR KEY TO COST CUTTING?

1. BLASTING
2. ROCK HANDLING
3. EQUIPMENT MAINTENANCE
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BLASTING IS THE KEY . . . . blasting with KING DETONITE, and we'll prove it to you right at your own quarry (see coupon below). With proper blasting, you get important reductions in *all* of these 4 major operating costs:

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KING DETONITE breaks up rock into sizes that permit shovels to dig efficiently at all times, thus reducing handling costs to a minimum.

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KING DETONITE's proper fragmentation means less wear and tear on expensive equipment . . . less cost for maintenance and replacement.

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KING DETONITE's proper fragmentation allows your crushers to operate at top capacity, thus lowering cost of processing the stone.

4 WAYS TO CUT COSTS

King Powder Co., Inc.
Cincinnati 1, Ohio

SHOW ME how DETONITE will cut my costs 4 ways. Without obligation, have the King Representative get in touch with me to arrange for a DETONITE demonstration right at our quarry.

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CINCINNATI 1, OHIO

PEOPLE in the news

Named Director

THOMAS M. WARE, vice-president in charge of the engineering division of the International Minerals and Chemical Corp., Chicago, Ill., has been elected a director of Dunlap and Associ-

Thomas M. Ware

ates, industrial consultants of Stamford, Conn. Mr. Ware has served in an engineering capacity with International since 1952. A graduate of Cornell University, he has been a design engineer for Lockheed Aircraft Corp., chief engineer of the Radioplane Co., Van Nuys, Calif., project engineer of the special devices division of the Office of Naval Research, and staff engineer for George Fry & Associates.

Board Chairman

MARK H. SMALL, vice-president and manager of the Kansas division of Lone Star Cement Corp., New York, N.Y., has been elected chairman of the Jackson County board of visitors to succeed the late Mrs. William E. Kemp. Mr. Small has been a member of the board for eight years.

N.I.C.B. Speaker

ADDRESSING A MEETING of the National Industrial Conference Board in New York recently, Melvin H. Baker, chairman of the National Gypsum Co., Buffalo, N.Y., said that the answer to fears of a recession, production cutbacks and declines in defense buying is a hard-hitting selling job by business. "There is little question that our ability to sell faces a tremendous challenge," he declared. He called selling "our one best hope when defense buying declines." Mr. Baker emphasized the importance of creating demand, through "creative selling," in order to keep the level of business activity high. "Our economy," he stated, "is based on created human wants, rather than on necessities." "If the public buys more, plants are operated at capacity, wages will be high and steady, thus creating more purchasing power," he said. Mr. Baker stated that salesmanship can continue to increase our standard of living and that "the task is to educate 163 million Americans to accept and work for a higher standard which their vast productive capacity warrants."

Elected Vice-President

LESTER CROWN has been elected vice-president of Material Service Corp., Chicago, Ill. He is also vice-president of the Marblehead Lime Co., a subsidiary, and director of the Empire State Building Corp. and the Stanley Warner Corp. Joseph W. Leahy has been appointed assistant comptroller, and Joseph L. Trischan has been named assistant treasurer.

Elected an Honorary Member of the Board

STEPHEN STEPANIAN, president of the Marble Cliff Quarries Co., Columbus, Ohio, has been elected an honorary member of the board of directors of the National Ready Mixed Concrete Association and an honorary life member of the association. Mr. Stepanian, who is also president of the Arrowcrete Corp., and vice-president and general manager of the Arrow Sand and Gravel Co., is a former president of the association and one of its charter members. He came to the United States from his native Armenia as a young man, after being educated at Roberts College in Constantinople. He joined the engineering department of the Jeffrey Manufacturing Co., specializing on equipment for the construction industry. He changed his interests to the sand and gravel and the crushed stone industries, and then to the manufacture of ready-mixed concrete. It was he who conceived the idea of the modern truck mixer and agitator and was the first applicant for letters of patent covering all essentials of the unit. Mr. Stepanian has been a great asset to the ready-mixed concrete industry and has every right to be proud of the creative role which he played. We understand that he is planning to retire from active management of the Arrow Sand and Gravel Co., and we all hope that he and Mrs. Stepanian will have many years of pleasant retirement before them.

Keynote Speaker

VINCENT P. AHEARN, executive secretary, National Industrial Sand Association, was keynote speaker at the November 19 general meeting of the Industrial Hygiene Foundation at Mellon Institute, Pittsburgh, Penn. His topic was "The Role of Government in the Employer-Employe Relationship."

Named Directors

PAUL J. RUTAN, vice-president of sales, Hercules Cement Corp., Philadelphia, Penn., has been appointed a director of the company, and Robert B. Wolf, attorney, has been named to succeed his father, Morris Wolf, as a director.

Mr. and Mrs. Stephen Stepanian

Walter C. Nuhn

General Manager

HORACE STRAIGHT has been appointed general manager of the Devil's Slide, Utah, plant of Ideal Cement Co., Denver, Colo. He succeeds A. W. Hooton, who has been named manager of the Portland, Colo., plant, to replace S. A. Gretencourt who has been promoted to the staff of the general superintendent in Denver. Mr. Straight has served the cement industry since 1933. A graduate of the University of Washington, Seattle, with a degree in chemical engineering, he was formerly with the Riverside Cement Co., Oro Grande, Calif., and joined the Devil's Slide plant in 1950. Mr. Gretencourt joined Ideal in 1938 and was appointed manager of the cement plants and plaster plant at Portland in 1948.

Advertising Manager

BEV BROWER has been appointed advertising manager for asbestos products, National Gypsum Co., Buffalo, N.Y. He was formerly assistant to the advertising and sales promotion manager of Toastmaster products division of McGraw Electric Co. Mr. Brower is a graduate of the University of Missouri School of Journalism.

Heads Concrete Firm

GIOACCHINO PEZZA has been elected president of the Park Avenue Cement Block Co., Providence, R.I. Samuel Vigliotti was named vice-president; Joseph Capobianco, recording secretary; Domenic Boezi, financial secretary; and Antonio Saracini, treasurer.

Named Chairman

O. K. HALLADAY, maintenance superintendent at the Redwood City plant of Kaiser Gypsum Co., Oakland, Calif., was recently elected chairman of the newly organized Northern California Council of Industrial Management Clubs.

Elmer C. Jacobson

Huron Appointments

WALTER C. NUHN has been appointed superintendent of the Detroit distributing plant of Huron Portland Cement Co., Detroit, Mich., to succeed Elmer C. Jacobson who has retired after more than 33 years of service. Mr. Nuhn had been superintendent of the Buffalo distributing plant since 1930 and will be succeeded in this position by Raymond T. Kanavel. Mr. Jacobson joined the Detroit plant in 1920 as clerk and later became foreman. Three years later he transferred to Milwaukee to become the first superintendent of the new distributing plant being built there. In 1925 he returned to Detroit where he served as superintendent until his retirement.

Visitor to United States

GEORGE FOSTER EARLE, chairman of Associated Portland Cement Manufacturers, Ltd., of England, was a visitor to Washington and New York recently on the last lap of a trans-world air trip for the purpose of inspecting cement plants, visiting Malaya, Australia, New Zealand and Canada. Mr. Earle has been chairman and joint managing director of A.P.C.M. since 1946, and has been associated with the company for 31 years. He is also chairman of his own company, G. & T. Earle Ltd., and a vice-president of the Institute of Directors.

Elected Treasurer

B. J. STEGER, controller of The France Stone Co., Toledo, Ohio, has been elected treasurer of the Toledo Control of the Controllers Institute of America. Kenneth A. Stotler, secretary-treasurer of the Pioneer Sand and Gravel Co., Seattle, Wash., has been named a director of the Seattle Control of the Institute.

Raymond T. Kanavel

Engineering Consultant

ROBERT E. TOBIN has resigned as district engineer of the Spokane, Wash., office of the Portland Cement Association, Chicago, Ill., to accept a position as engineering consultant for the Spokane Concrete Pipe Co. Mr. Tobin's duties will involve the development of precast and prestressed concrete products as well as handling other engineering assignments. Prior to joining the P.C.A. in 1945, Mr. Tobin served for seven years on the engineering faculty of Gonzaga University, Spokane, Wash. He holds engineering degrees from the University of Wyoming and Iowa State College. He is president of the Associated Engineers of Spokane and the Spokane section of the American Society of Civil Engineers.

Assistant Sales Manager

EDWARD L. HIGGINS, formerly sales representative in the Columbus office of the Southwestern Portland Cement Co., Los Angeles, Calif., has been appointed assistant sales manager at Fairborn, Ohio. A graduate of Miami University, Oxford, Ohio, Mr. Higgins joined the firm in 1941. He served in the Armed Forces of World War II for three years and upon his return was made sales representative.

On Flood Committee

PAUL W. SEITZ, vice-president of the May Sand and Gravel Corp., Fort Wayne, Ind., has been appointed by Mayor Harry W. Baals as chairman of a committee to make a scientific study of flood problems and prevention in Fort Wayne, Ind.

On Board of Directors

JOHN C. BEST, vice-president of the National Gypsum Co., Buffalo, N.Y., has been elected to the board of directors of the American Arbitration Association, according to an announcement by Whitney N. Seymour, president of the association.

Directs Many Activities

JOHN W. ROBERTS, president of Southern Lightweight Aggregate Corp., Richmond, Va., is only 35 years of age but his broad shoulders carry unusually heavy responsibilities for a man of his years. Besides being president of the Southern Lightweight Aggregate Corp. and the Carolina Solite Corp., Mr. Roberts is vice-president of Southern Materials, Inc., and a director of the National Ready Mixed Concrete Association. He is a past president and is now a director of the Virginia Ready Mixed Concrete Association, and president of the Virginia section of the American Society of Civil Engineers.

Born in Princess Anne, Md., in 1918, Mr. Roberts attended Swarthmore College, Swarthmore, Penn., where he received a B.S. degree in civil engineering in 1939. After serving eight months with the Bethlehem Steel Co. in Pennsylvania, he joined the Southern Materials Corp., Richmond, Va., established by his father in 1938, and became manager of the company. In 1945, his father and other members of the family sold their interests in the company to the present owners, and the name was changed to Southern Materials, Inc. Southern Lightweight Aggregate Corp. is an affiliate of Southern Materials, Inc., and Carolina Solite Corp. is a wholly-owned affiliate of Southern Lightweight Aggregate Corp. The Solite Co. has established a $1 million plant at Aquadale, N. C., for processing slate-type rock to make lightweight aggregate for use in concrete. The plant is expected to go into operation soon. A similar plant operated by Southern Lightweight Aggregate Corp. in Buckingham County, Va., is said to be the largest plant of its type in the world.

Mr. Roberts is a member of the American Concrete Institute, American Society for Testing Materials, Virginia Society of Professional Engineers, and the Society of American Military Engineers.

Plant Manager

FRED L. BUCHANAN has been appointed plant manager of the Pryor, Okla., paper mill of National Gypsum Co., Buffalo, N.Y. He succeeds Paul J. Dumas who has been named manager of the New Orleans asbestos plant. Mr. Buchanan was formerly plant manager of the paper mill at Kalamazoo, Mich.

Joins Lime Concern

MARTIN M. KELIHER has resigned from the Soil Conservation Service to accept a position with the Neuheisel Lime Works, Inc., Eau Claire, Wis., where he will be in charge of sales, promotional and educational work, and the distribution of agricultural limestone. Mr. Keliher started in the soil conservation service in 1933, at the LaCrosse Experiment Station. He moved to Eau Claire in 1942 and served as district soil conservationist in that area. He has recently been located at Winona, Minn., as project manager of the first soil conservation demonstration project in that state. Mr. Keliher is a graduate of LaCrosse State Teachers College, LaCrosse, Wis., and did graduate work at the University of Minnesota, College of Agriculture, in soils and agronomy.

Assistant to President

HAROLD F. MORNINGSTAR has been named assistant to the president of Maule Industries, Miami, Fla. He was formerly manager of the Miami branch of Firestone Tire and Rubber Co.

OBITUARIES

HOWARD S. SCHURMANN, president of the Independent Concrete Pipe Corp., Indianapolis, Ind., died October 13. He was 77 years of age. Known as the "father of the concrete pipe industry," Mr. Schurman was a native of Indianapolis and attended Rose Polytechnic Institute, Terre Haute, and Purdue University, Lafayette. In 1913 he became sales manager of the Concrete Products Corp., which was later reorganized as the Independent Concrete Pipe Co., with plants in Chicago, Ill., St. Louis, Mo., and Mishawaka, Ind.

LEROY ROPER, manager of the Zeidler Concrete Pipe Co., Joplin, Mo., died suddenly last March 14, while on a fishing trip with friends. Born on a farm near Carthage, Mo., he followed the construction industry for many years and later served with the Missouri State Highway Department. In 1936 he joined the Zeidler Concrete Pipe Co. as plant foreman, later becoming manager. An active member of the American Concrete Pipe Association, Mr. Roper was also an ardent sportsman and an expert at trap and skeet shooting.

JESSE BAKER HUNT, SR., sales manager of the Raleigh, N. C., branch of the Carolina Concrete Pipe Co., Inc., Charlotte, N. C., passed away on July 2. He was 64 years old. Born in Goldsboro, N. C., and educated at La-Salle University, New York, N.Y., Mr. Hunt was also president of J. B. Hunt and Sons, Inc., Raleigh, N. C., and an active member of the American Concrete Pipe Association.

FLOYD H. COMPTON, chief engineer of the Nazareth, Penn., plant of Penn-Dixie Cement Corp., New York, N.Y., died September 23. He was 58 years old. A native of Pennsylvania, Mr. Compton was graduated from Lafayette College, Easton, Penn., in 1916 as a mechanical engineer. He joined the Portland Cement Association as conservation engineer in 1920. He left there in 1922 to become assistant superintendent of the Louisville Cement Co., subsequently becoming superintendent and then chief engineer. In 1937 he was appointed general superintendent of the two plants of the Allentown Portland Cement Co. and the Valley Forge Cement Co. Mr. Compton, who served as a First Lieutenant in the Army Engineer Corps in World War I, was a member of the Professional Engineers of Pennsylvania.

JACK L. SOTHERLAND, district sales manager of the Cleveland, Ohio, office of Lehigh Portland Cement Co., Allentown, Penn., died September 29 at his home in Lakewood, Ohio. He was 55 years old. Mr. Sotherland joined the New York office of the company in 1931, transferring to North Carolina in 1944. One year later he became district sales manager at Cleveland.

KIRK G. HOWARD, chief electrician at the Detroit and Port Huron, Mich., plants of the Peerless Cement Corp., Detroit, Mich., died recently after a long illness. He was 61 years old. Born in Kansas City, Mo., Mr. Howard joined Peerless in 1925, where he gained wide recognition as an electrical technician.

GEORGE LEWIS EARLE, retired president of the Genesee Gravel Co., Mt. Morris, Mich., passed away September 9 after a long illness. He was 69 years of age. Mr. Earle was also president of the Earle Equipment Co., Detroit, and the North Wayne Tool Co., Oakland, Mich.

C. L. ABNEY, district manager of the Merry Bros. Brick and Tile Co., Jacksonville, Fla., died suddenly at Daytona Beach, Fla., while on a business trip. He was 52 years old. Born in Harrisburg, Ill., Mr. Abney had been a resident of Jacksonville for 25 years.

E. P. SHAPLAND, general manager and secretary-treasurer of the Nelsen Concrete Culvert Co., Champaign, Ill., died September 26 at the age of 63. He had been associated with the company for about 35 years.

LLOYD W. STRAYER, retired chief engineer of the Pittsburgh Limestone Co., New Castle, Penn., died September 23 after a long illness. He was 67 years of age.

CHARLES H. SMITH, superintendent of the Superior Concrete Block and Brick Co., Springfield, Ohio, died suddenly on September 30. He was 48 years old.

ALBERT MOYER, retired president of the Vulcanite Portland Cement Co., New York, N.Y., died October 12 after a long illness. He was 82 years old.

ROBERT EDGAR KNIGHT, engineer for the American Aggregates Corp., Greenville, Ohio, died September 24 at the age of 71.

ON JOBS LIKE HUNGRY HORSE DAM The Texaco Simplified Lubrication Plan saves time, mistakes and money

A. E. McCloud Photo—Bureau of Reclamation

THE BIGGER THE JOB, the more you need the Texaco Simplified Lubrication Plan. It enables you to *handle all your major lubrication with no more than six Texaco Products!* The following comments by contractors are typical:

"The time and confusion saved by the Texaco Simplified Lubrication Plan are incalculable."

General-Shea-Morrison Co.,
Hungry Horse Dam, Montana

"By reducing the number of lubricants we have to use, we have substantially reduced the chance of error in application, and have speeded our maintenance work . . . keeping our equipment on the job and our maintenance costs low."

Chief Joseph Builders,
Chief Joseph Dam, Bridgeport, Washington

"The saving of time and elimination of guesswork . . . were important contributing factors in completing the contract on schedule."

J. M. Corbett—M. J. Boyle Co.,
O'Hare Field Base Extension,
Chicago, Illinois

A Texaco Lubrication Engineer will gladly develop for you a Texaco Simplified Lubrication Plan exactly suited to your equipment and operating conditions. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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FOR ALL CONTRACTORS' EQUIPMENT

industry news

Wins Reporting Award

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., for the ninth consecutive year, won the bronze "Oscar of Industry" trophy for its excellence in annual reporting, in the 13th international competition sponsored by the *Financial World* Annual Report Survey.

Over 5000 reports, judged in 100 industrial classifications, were considered in the competition. An independent board of judges named Marquette's 1952 annual report as the best in the cement industry. Lehigh Portland Cement Co., Allentown, Penn., was runner-up for top honors, while Lone Star Cement Corp., New York, N.Y., placed third.

Weston Smith, *Financial World's* executive vice-president and originator of the annual report surveys, presented the "Oscar of Industry" trophies at the annual awards banquet, held in the Grand Ballroom of the Hotel Statler, New York, N.Y., October 26, 1953.

Silica Sand Plant

MARION SILICA CO., Marion, Ky., recently began production at its new silica sand processing plant. Cost of the plant and quarry equipment was approximately $250,000. Most of the plant's output will be used by the glass-manufacturing industry. Several carloads have already been shipped to General Electric Co.'s bulb plant at Lexington, Ky., and to the Corning Glass Works in Danville, Ky. Officers of the new company are N. H. Bogie, president; J. B. Alexander, vice-president; Dudley Payton, second vice-president; and R. R. Holland, secretary-treasurer.

Limestone Quarry

COLORADO-YULE MARBLE CO. has sold its marble deposits south of Carbondale, Colo., to a recently formed corporation headed by Allyn Cole, Robert Bosworth and Carl Norris. The new corporation will quarry limestone at Marble, and will build a lime kiln at the site of the old marble mill next spring, with plans for further expansion.

Rock Wool Plant

BALDWIN-HILL CO.'S Temple, Texas, plant has started production of rock wool insulation, using a new patented spinning process. Production is about 800 tons per month. The plant produces spun-wool batts for home installation, granulated wool which is blown into walls and ceilings, and industrial felts and blankets. The only such plant in Texas, it supplies Texas, New Mexico, Louisiana, Arkansas, Mississippi, Oklahoma, and parts of Kansas and Missouri. To facilitate service, a fleet of ten (with two to be added soon) large trailer-van delivery trucks are operated from the Texas plant. The company also operates rock wool insulation plants at Huntington, Ind., Kalamazoo, Mich., Trenton, N. J., and Housatonic, Mass.

Cover Picture

ON THIS MONTH'S COVER of ROCK PRODUCTS is an illustration of the crushing and screening plant of M. C. Granite Co., Fortson, Ga., a very compact set-up. A Caterpillar D397 diesel-electric unit provides power for granite crushing and screening operations, and a Caterpillar diesel DW10 tractor with Athey wagon hauls the blasted stone from the quarry to the primary crusher. The plant is arranged for straight-in-line production, combining gravity flow and belt conveyor transportation of materials.

Fluorspar

NEWFOUNDLAND FLUORSPAR MINES, LTD., subsidiary of Aluminum Co. of Canada, has been given exploration rights to an additional 500 sq. mi. of the Burin Peninsula. The company, which operates at St. Lawrence, on the province's south coast, expects to double its output and possibly triple its production within the next two or three years. During the past two years, the St. Lawrence mine has been producing between 45,000 and 50,000 tons.

Change of Ownership

MCCORKLE STONE CO., Milroy, Ind., producer of agricultural limestone, crushed stone and Dunbrick brick and block, has been sold to Richard L. Flerlage and Arthur M. Holmes. Former owner was Albert E. Schneider, president, Stedman's Foundry and Machine Co., Inc., Aurora, Ind.

Opens Limestone Quarry

CARL PARTIN, Unionville, Mo., is opening a limestone quarry near Elko, Mo., on farm property owned by Darl and Gladys Gillum.

Fleet Expansion

NEW YORK TRAP ROCK CORP., New York, N.Y., recently announced the launching of the second of 12 new scows being built at a total cost of $1,500,000 by Sound Shipbuilding, College Point, Long Island (See ROCK PRODUCTS, July, 1953, issue, p. 47.) Following company policy of naming scows after long-service employes, the newly launched scow was named the "Anthony Bova" in honor of a 30-year employe. The ceremony was presided over by Wilson P. Foss, III, president of the corporation. With the addition of the new scow, Trap Rock's fleet now numbers 170 deck scows.

To Open Talc Mine

INTERNATIONAL TALC CO., Gouverneur, N.Y., has formed an agreement with Loomis Talc Corp., Gouverneur, N.Y., to open up International's Wight mine and grind the ore at the Loomis plant. The arrangement between the two talc companies, similar to an agreement reached in 1948 when one of International's plants burned down, provides for ore to be shipped to customers of both companies.

Features 3-D Cover

DRAGON CEMENT CO., New York, N.Y., in a recent issue of its company publication, the "Dragon," has become the first of more than 10,000 companies to use a three-dimensional photograph on its cover. The photograph shows an aerial view of the Thomaston, Maine, cement plant. A similar picture of its Northampton, Penn., plant will be published when its improvement program is completed.

Safety Celebration

STANDARD LIME AND STONE CO., Baltimore, Md., recently held a banquet for the employes of its Bakerton, W. Va., plant, in celebration of the completion of two years of safe operation. Speakers at the banquet included Daniel Baker, Jr., president, and W. D. Garvin, general superintendent.

Crushed Stone Plant

CLEM CROWLEY and T. P. Spurlock are operating a crushed stone plant at Georgetown, Texas, with a daily production of about 100 to 150 cu. yd. Plant facilities include a truck-mounted crusher, conveyor belt systems, dump trucks, a bulldozer and loader, washing and vibrating screens, and accessory equipment.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 24,289,000 bbl. of finished cement in August, 1953, as reported to the Bureau of Mines. This was an increase of 3 percent, compared with the output in August, 1952. Mill shipments totaled 27,092,000 bbl., an increase of 5 percent over the August, 1952, figure, while stocks were 28 percent above the total for the same month in 1952. Clinker production during August, 1953, amounted to 23,370,000 bbl., an increase of 5 percent, compared with the corresponding month of the previous year. The output of finished cement during August, 1953, came from 156 plants located in 37 states and in Puerto Rico. During the same month of 1952, 23,573,000 bbl. were produced in 155 plants.

Builds Shale Plant

BASIC BUILDING PRODUCTS, INC. is building a $250,000 expanded shale ligthweight aggregate plant at Anchorage, Alaska. The aggregate will be known as "Baselite" and, eventually, will be used in the production of clay brick at the plant. Future plans also include lime burning operations and masonry cement production. The plant facilities will include an 8- x 106-ft. rotary kiln. Arthur F. Waldron is president of the firm, Jack F. Harrison, vice-president and general manager, and Howard Brown, secretary-treasurer.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of September and for the first nine months of 1953 are listed by the Portland Cement Association as follows:

	Sq. yd. awarded	
	During September 1953	During first nine months 1953
Roads	4,066,013	32,555,390
Streets and alleys	2,018,763	21,185,505
Airports	1,102,092	8,870,391
Totals	7,186,868	62,611,286

Roofing Granules

MINNESOTA MINING AND MANUFACTURING CO., St. Paul, Minn., has announced plans for a $1,500,000 expansion of its roofing granule manufacturing facilities at Wausau, Wis. The project will include installation of additional crushing equipment at the quarry north of Wausau, and modernization and expansion of the granule coloring plant within the city. The new facilities are expected to increase granule production of the Wausau plant by one-third. The company also operates quarries and roofing granule plants at Little Rock, Ark., and Corona, Calif., and plans to establish a fourth plant in Somerset County, N. J. G. W. Swenson is vice-president in charge of roofing granule division.

Turkey to Expand Cement Output

THE TURKISH INFORMATION OFFICE, an official agency for the Turkish government, recently announced that foreign, as well as domestic, capital will be invited to bid for the construction of each of 38 new cement plants in Turkey. The new plants are being built to meet increasing demand created by industrial expansion, public works projects in many fields and for private homes. The announcement stated that everything is ready to solicit bids for 15 of the new installations, with five others to be advertised in a few months. The remaining 18 plants will be built in the next few years.

Turkey's present cement production is approximately 1,000,000 tons. This is expected to be doubled with the completion of the 15 new plants.

Canadian Cement

CANADIAN PORTLAND CEMENT SHIPMENTS totaled 10,432,188 bbl. during the first six months of 1953, which was an increase of 18 percent over the 8,852,660 bbl. shipped during the first half of 1952, according to the Bureau of Statistics. Stocks at plants and warehouses at the end of June amounted to 958,070 bbl., compared with 766,833 bbl. for the same period of the previous year.

Portable Crushing Plant

SEDAN LIMESTONE CO., Sedan, Kan., producer of crushed roadstone, recently announced it has changed its plant operations from a stationary to a portable crushing plant, to enable the company to operate closer to road jobs and to cut down on the haul of roadstone from the quarry northwest of Sedan. Cost of the new portable crushing plant was approximately $100,000. Owner of the company is Millard Blake.

Portable crushing plant replaces stationary plant to reduce haul to road jobs

Vermiculite Properties

ZONOLITE CO., Chicago, Ill., recently announced publication of a manual, summarizing the chemical and physical properties of vermiculite, for distribution to industrial and university research laboratories. According to George F. Ziegler, research director, the manual is part of the company's program to stimulate pure and applied research into vermiculite's properties and uses.

Subjects covered in the 8-page report include the chemical composition of vermiculite; base exchange characteristics; solubility; water absorption; chemical carrier capacity; pH and buffering capacity; thermal properties; and a sieve analysis of grades. The report also lists typical chemical and physical uses of vermiculite, including uses as loose-fill insulation, as a catalyst organic compound preparation, as a filler and as a packing material.

Expanded Slag Plant

GARY SLAG CORP., Chicago, Ill., recently began production of "Garylite," an expanded slag lightweight aggregate, at its new plant on the property of U.S. Steel Corp., in Gary, Ind. Plant production is under the direction of P. J. Mack, general superintendent. Sales of "Garylite" will be handled by Raymond J. Graham, sales engineer. Other officers of the company include R. Newton McDowell, president, and Mrs. Donna Mills, vice-president. The company also operates a lightweight aggregate plant at the American Steel & Wire Div., of U.S. Steel Corp., in Duluth, Minn.

Employe Service Awards

SATICOY ROCK CO., Ventura, Calif., recently honored 39 of its employes with the presentation of continuous service awards at the company's annual barbecue, attended by over 300 employes and guests. Presentation of the awards was made by Fred Smith, vice-president and director of the company, and John Lagomarsino, treasurer and director. Two employes received 30-year awards; four employes, 25-year awards; and one employe a 20-year award. Also presented were three 15-year awards, eight 10-year awards, and 21 5-year awards.

Limestone Quarry

MISSOURI VALLEY LIMESTONE CO., Des Moines, Iowa, is opening a limestone quarry near Bedford, Iowa. Stripping operations are currently underway.

Buys Gravel Company

GEORGE AND RAYMOND SIETSEMA AND WESLEY P. HILL, Grand Rapids, Mich., have purchased Harry Zeeff and Sons Gravel Co., also at Grand Rapids.

Marquette Safety Record

EMPLOYEES of the Brandon, Miss., plant of Marquette Cement Manufacturing Co. were recently honored at a ceremony and picnic for their outstanding safety record. Since the plant and quarry were placed in operation in 1951, there has not been a single lost-time accident. At the time of the safety ceremony, employes at the Brandon quarry had operated 762 consecutive days without a lost-time injury, while the plant employes had completed 592 consecutive accident-free days. The plant was awarded the P.C.A. safety trophy. Presentation of the award was made by Ivan Le Gore, manager of the P.C.A. Accident Prevention Bureau, and accepted by William Sykes, plant safety supervisor, in behalf of the employes. Other guests attending the safety celebration included Walter A. Wecker, president of Marquette; Frank Moyle, S. L. Cribari, V. J. Hanley and L. W. Saxby, vice-presidents; Stuart Duncan, chairman of the board; William Moyle, plant superintendent; Ralph Boyce, mayor of Brandon; W. E. McIntyre, Jr., state senator; and Colonel Robert D. Marrow of Brandon, who delivered the principal address.

Leases Marble Quarries

WASHINGTON NON-METALLICS, INC., a recently formed corporation, has taken over operations at Northwest Marble Products Co.'s eight marble quarries and facilities, under a long-term lease. Plans have been made for immediate expansion, extending production to cover various type marble products. Present production consists of marble chips for terraces, patios and floors. R. H. Dill is president of the new firm, Gordon LaVigne, vice-president, and Richard F. Thorsen, secretary-treasurer.

Spanish Potash Mines

EMPRESA NACIONAL ADARO, an affiliate of the state-owned Instituto Nacional de Industria, has announced plans for potash mining operations at Astrain and Esparza de Galar, Spain. Each of the two mines is expected to have an annual capacity of 680,000 tons of potash ore, from which approximately 170,000 tons of potassium chloride are to be extracted. The ore will be processed into fertilizers at a plant which will be built near Pamplona, Spain.

Alumina Pilot Plant

THE ALUMINA PILOT PLANT at Laramie, Wyo., is continuing its work on sample test runs and experiments on anorthosite rock from nearby Laramie deposits which are said to be almost unlimited. The $4,500,000 experimental plant was built by the federal government during World War II for testing purposes, but was closed down before completion. The Bureau of Mines later took over the completion and operation of the plant. (See ROCK PRODUCTS, February, 1952, issue, p. 78.)

Two more years of testing will be required before decisions are final on all factors in producing alumina from aluminum silicates. When the plant is in full scale opertion, about 700 tons of material daily (265 anorthosite and 435 limestone) will be processed. From this, a total of 590 tons of sinter, 450 tons of residue and 60 tons of alumina will evolve.

Sand and Gravel Plant

RAMAPO SAND AND GRAVEL CORP. has begun operations at a sand and gravel plant in Ramapo, N.Y. B. Franklin Reinauer II of Ridgewood, N. J., is president of the corporation, and Walter Powers, secretary.

Closes Talc Mine

THE LOOMIS TALC CORP., Gouverneur, N.Y., has closed its No. 4 "Ontario" mine at Little York, N. J.

Moves Crushing Plant

QUARTZITE STONE CO., INC., Lincoln, Kan., is moving its crushing plant at Wolf Creek, Kan., to a farm location just south of Lincoln, which brings all of the company's operations to the Lincoln area. In addition to crushed stone, the company produces concrete pipe and block, and precast and prestressed bridge spans. Officers of the company are: J. R. Carlgren, president and treasurer; W. A. Buzick, Jr., vice-president; E. W. Forney, secretary and manager of the concrete operations; and Henry Menkemeyer, research engineer.

Cuban Cement Plant

ACCORDING TO A RECENT REPORT, European capitalists are putting 4,500,000 Cuban pesos into construction of a cement plant at Santiago, Cuba. The plant, which is scheduled to begin operations in December, is expected to produce about 3000 bags of cement per day.

Coming Conventions

November 15-17, 1953—
Southeastern Concrete Masonry Association, Annual Meeting, Ft. Sumter Hotel, Charleston, S. C.

December 6-7, 1953—
Missouri Limestone Producers Association, 9th Annual Convention, Governor Hotel, Jefferson City, Mo.

January 5-7, 1954—
American Road Builders' Association, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

January 19-20, 1954—
Concrete Products Association, Plankinton Hotel, Milwaukee, Wis.

February 8-11, 1954—
National Concrete Masonry Association, 34th Annual Convention, Shoreham Hotel, Washington, D. C.

February 14-18, 1954—
American Institute of Mining & Metallurgical Engineers, Annual Meeting, New York, N.Y.

February 15-19, 1954—
National Ready Mixed Concrete Association, 24th Convention and Exposition, Conrad Hilton Hotel, Chicago, Ill.

February 15-19, 1954—
National Sand and Gravel Association, 38th Convention and Exposition, Conrad Hilton Hotel, Chicago, Ill.

February 18, 1954—
National Agricultural Limestone Institute, Board of Directors Meeting, Blackstone Hotel, Chicago, Ill.

February 19-20, 1954—
National Agricultural Limestone Institute, Annual Convention, Blackstone Hotel, Chicago, Ill.

February 22-24, 1954—
National Crushed Stone Association, 37th Annual Convention and Manufacturers Division Exposition, Conrad Hilton Hotel, Chicago, Ill.

February 24, 1954—
American Concrete Agricultural Pipe Association, 4th Annual Convention and Meeting, The Fairmont Hotel, San Francisco, Calif.

February 25-27, 1954—
American Concrete Pipe Association, 46th Annual Convention and Meeting, The Fairmont Hotel, San Francisco, Calif.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Rock Transfer Chute

AT A NEW TEXAS CRUSHED STONE OPERATION, the secondary unit is a jaw crusher which operates in closed circuit with the scalping screen. The

Rock from the return belt falls to steel transfer chute with sloping bottom. The chute outlet is a heavy steel plate, hinged near its center of gravity so that it opens with impact of falling rock

throughs from the crusher are conveyed back to the No. 1 belt from the primary crusher which is a 42- x 30-in. jaw crusher. The transfer assembly from belt to belt is shown in the illustration. The rock from the return belt falls to a steel transfer chute with a sloping bottom. The outlet to this chute is a heavy steel plate that is hinged or pivoted near its center of gravity so that it opens with the impact of the falling rock. This relieves some of the force of impact from the belt, thereby lengthening the life of the off-bearing belt and, at the same time, helping to reduce the chances of a hang-up due to too small an outlet opening in the chute.

Reducing Heat in Kiln Rooms

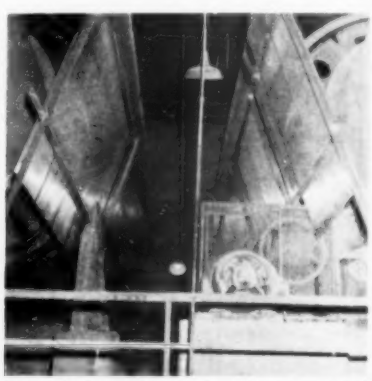
THE PRINCIPLE OF HEAT RADIATION is an important factor in the problem of providing relief from excessive heat. To cool off a hot room, ventilation and air-cooling are the best methods when the heat is mostly convected, or carried by the air. However, if the heat is mostly radiated, moving the air doesn't help much because radiated heat moves directly from the source rather than through the air. Radiant heat moving in a straight line will heat every object within visible range, such as roofs, floors, walls and nearby machinery and equipment. These receiving surfaces become heated and in turn become sources of further radiant heat. Since radiation moves only in a straight line, the solution to the problem lies in the use of shielding materials to reflect away the rays before they can reach other surfaces, or human beings.

Huron Portland Cement Co., Detroit, Mich., is beating this heat problem in the kiln rooms of its Alpena, Mich., plant. Last spring company engineers began experiments using the heat shielding principle to protect the kiln room employes from the uncomfortable heat radiated by the large rotary kilns. The first experimental installation was made along the walkways which run between the No. 11 and 12 kilns in the No. 2 kiln room. On either side of the walkways at either end large sheets of corrugated aluminum have been placed near the kiln shells to reflect radiated heat back and upward. Additional sheets have been placed over the hot air piping takeoff and dust trap above the firing end of the kiln to protect the burner from excessive heat when he checks the fires. Further tests are still being made. One problem lies in the fact that because a good shield is highly reflective, a shield installed to lick one heat condition may cause another one somewhere else in the room by reflecting heat to that area. The company states that as it learns how and where to place shields for top comfort and working efficiency, further steps will be taken, both in the mill kiln rooms and elsewhere throughout the company's operations, to give relief from heat caused by radiation.

The first experiments in heat shielding were made in the glass and steel industries. Engineers reportedly found that the most practical and economical material for the shields was aluminum, which reflects 90 to 95 percent of the heat as a mirror reflects light. Also, it was found that aluminum emits only about one-tenth of the small amount of heat it does absorb.

Detecting Noise Sources in Machinery

DIFFICULTIES in localizing mechanical troubles in production equipment can often result in considerable expense in "down-time." The cost of locating the trouble spot is often more than the actual repairs. Some plant operations are solving this problem by the use of a portable electronic instrument, with audio-video features, designed for locating noise sources in all types of mechanical equipment. The instrument consists of a metal probe which serves as a microphone, an electric amplifier and selector, and a set of headphones. In operation the



Left: Heat-reflecting shields are installed along walkways between large rotary kilns. Center: Close-up of shielding around drive ends of kilns. Right: Heat shields are also placed around piping takeoff and dust trap above

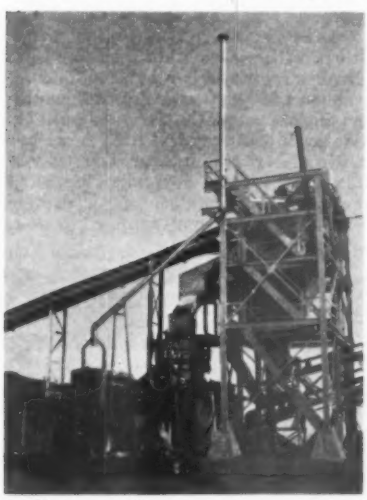
metal probe transmits impulses electrically to the earphones through the amplifier. When the probe is placed in contact with the suspected source of noise, the sound vibrations are amplified so that the exact point of trouble can be immediately spotted by moving the probe to different loca-

Portable electronic instrument, with audio-video features, aids in locating mechanical trouble spots in production equipment, thus helping to reduce expensive down-time

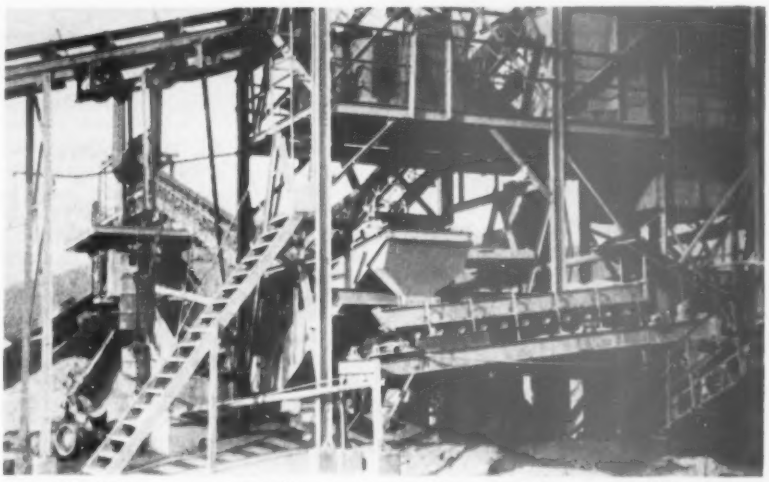
tions to determine where the sound is loudest. By manipulating the sensitivity control, sound can then be identified and its cause analyzed. It is said to be useful in detecting trouble spots in bearings, pistons, gears, ratchets, cams, clutches and other moving parts. The unit also includes a milliammeter for electrically recording the sound impulses, thus giving a visual as well as audible check. The device, known as Elec-Detec Model V, was developed by Anco Instrument Div. of American Name Plate & Mfg. Co., Chicago, Ill.

Diesel Air Supply

THE PROBLEM of getting clean air for a diesel engine in dusty locations around a plant can be solved by giving careful attention to location of the air intake. One sand and gravel operator in the Rocky Mountain area solved the problem simply and economically as shown in the illustration. A scalper screen in the tower structure sends its oversize to the cone crusher. These units operate dry. The air intake is well above the sources of dust.



Air-filter assembly at a western sand and gravel plant



Dewatering belt conveyor which delivers masons sand from sand drag to stockpiling conveyor

Secondary Crusher Set-Up

AT A NEW OHIO CRUSHED STONE OPERATION, two Symons cone crushers do the secondary crushing. The throughs from the crusher are conveyed by belt conveyor back to the screens ahead of the cones by a belt that serves both crushers. The unusual feature of the design is the use of a short stub conveyor under each cone crusher, with these stubs delivering at right angles to the off-bearing belt. The circulating load of stone in this secondary crushing operation is heavy. The use of the stub belts saves considerable head room. In this case, the cones rest on concrete foundations of nominal height.

Dewatering Conveyor

AT A LARGE MIDDLE WEST sand and gravel operation an interesting dewatering belt conveyor set-up is used. As shown in the illustration, a sand drag delivers masons sand to the short Kern dewatering belt conveyor which delivers to a stockpiling belt conveyor.

This cross belt conveyor is inclined at about a 10 percent grade. It is 15 ft. long with 22-in. belting and travels at about 25 f.p.m. The sand is confined by 12-in. skirt boards to a 12-in. width on the belt, building up a filtering bed for drainage. The water drained off drops over the sides of the belt on to a pan under the conveyor extending for its full length. It drains toward the lower end into the main flume disposing of the overflow water from the sand drag.

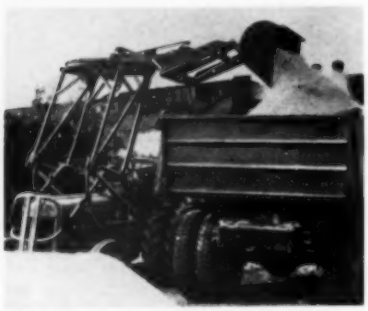
The sand remains on this belt only about 45 seconds before transfer onto the stockpiling belt conveyor. A surprising amount of free water is removed with this equipment.

Short stub conveyors under each cone crusher deliver at right angles to the off-bearing belt serving belt No. 1 of the plant

NEW Machinery

Swing Loader

WAGNER IRON WORKS, Milwaukee, Wis., has introduced Model WSL, a swing loader with a 180-deg. lateral swing for loading and dumping on either side of a tractor. The unit is

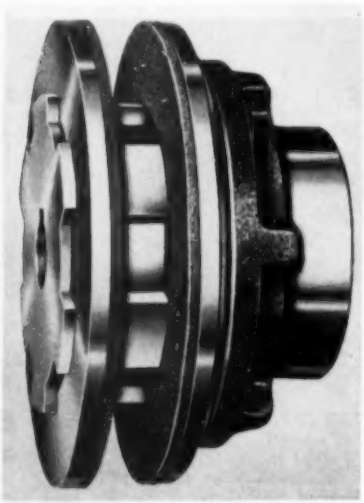


Tractor-mounted, swing loader has 180-deg. lateral swing

equipped with a standard independent hydraulic system, and has a lifting capacity of ½ ton to a height of 10 ft. Wheel weights and dual rear tractor wheels provide a stabilizing effect against tipping. Originally designed as an attachment on Ford and Ferguson tractors, it is now being developed for use on all makes of wheel and light crawler tractors.

Torque-Limiting Clutch

MORSE CHAIN CO., 7601 Central Ave., Detroit 10, Mich., has brought out a line of adjustable torque-limiting clutches which provide overload protection for machine drives in conveyors, materials handling equipment, and devices and equipment where torque capacity of the drive does not exceed 260 ft.-lb. The slip-type friction clutches, which act as automatic shear pin mechanisms, are used in connection with the standard Type A plain plate roller chain sprockets and are especially adapted to roller chain drives. The clutches are said to be tamper-proof and thus maximum setting cannot be exceeded. They are mounted on driveshafts with a standard keyway and setscrew arrangement, and may be disassembled by removing the adjusting nut.



Adjustable, slip-type, torque-limiting clutch

Hardsurfacing Flux

LINCOLN ELECTRIC CO., Cleveland 17, Ohio, has developed a technique for automatic hardsurfacing in which the alloy content of the deposited metal is supplied by an agglomerated granular flux rather than by the electrode. Automatic hardsurfacing may be applied with the conventional mild steel electrode, substituting the hardsurfacing flux for the mild steel flux normally used. Any standard automatic welding head or manual Lincolnweld equipment may be used without any changes. By diluting the hardsurfacing flux with mild steel flux, hardsurfacing properties can be matched to service requirements.

Flux H-545 is to be used when a smooth layer of good abrasion resistance and high impact strength is required. It is an alloy of carbon, manganese, silicon, chromium, molybdenum and vanadium, is magnetic at room temperature, and with recommended procedures, has a consistent hardness of 53-57 R.C. Flux H-550 is used for extremely abrasion resistant deposits with good impact strength, such as crusher rolls and liners, scraper blades, etc. It is an alloy of carbon, manganese, silicon, chromium and molybdenum, is magnetic, semi-austenitic at room temperature, and a broad range of 36-62 R.C. hardness can be developed. This deposit is non-machinable.

Diesel-Mounted Loader

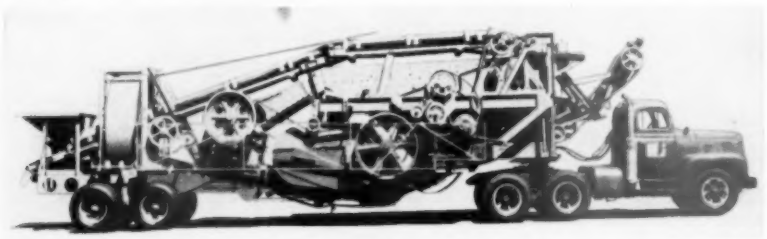
BAKER-LULL CORP., 314 W. 90th St., Minneapolis 20, Minn., has brought out the Shoveloader with diesel power

Loader mounted on diesel-powered tractor

and a front-end loading capacity of 5000 lb., mounted on a Sheppard industrial wheel-type tractor. An eight-speed transmission permits full throttle operation at each job speed, and the tractor design is said to permit operation in mud, water and uneven ground. The unit is available with seven materials handling tools and will crowd and dig below tractor level, lift a full capacity load to 10 ft. 3 in., dump it at 8 ft. 6 in., and reach 5 ft. 10 in. ahead of the tractor radiator shield.

Crushing-Screening Plant

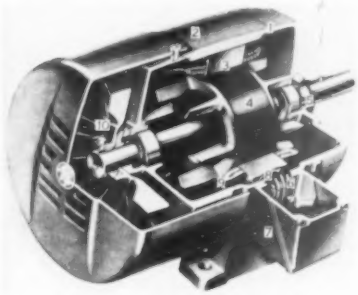
DIAMOND IRON WORKS, INC., 1748 N. Second St., Minneapolis 11, Minn., has brought out the "All American 77" portable crushing and screening plant. It features a hydraulic mechanism, operated by a hand control on the operator's platform, for raising and lowering the 4- x 12-ft. vibrating screen to and from traveling position. An oversized 36- x 22-in. star gear roll crusher is designed to crush 2¼-in. material to ¾-in. aggregate, thus relieving the 10- x 36-in. jaw crusher of preparing material to 1¾-in. for crushing in a smaller set of rolls. Approximate plant capacity is 350 tons of ¾-in. minus material per hr. The plant is mounted on an electrically welded steel gooseneck truck with a fifth wheel plate and pin on the front, and two axles and equalizer on the rear, on which are mounted eight pneumatic tires. As optional equipment, the plant can be furnished with either a single or double axle front dolly, sand rejector, chip eliminator, and mechanical, air, or vacuum brakes on the four supporting rear wheels.



Portable crushing and screening plant

Fan-Cooled Motor

GENERAL ELECTRIC CO., Schenectady 5, N.Y., has announced a complete, redesigned line of polyphase a-c motors, designated Tri-Clad "55." An average size reduction of 50 percent by volume and an average of 22 per-



Polyphase a-c, fan-cooled motor

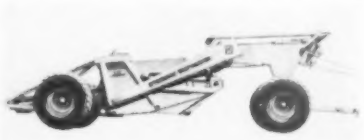
cent less weight per horsepower have been achieved.

The features, as shown in the cutaway view, are: (1) a moisture-proof sealing compound; (2) the motor is completely enclosed by rigid cast-iron construction; (3) the phases and slot tubes are insulated by a synthetic polyester film to provide moisture-resistance, heat-aging life, and dialectric strength; (4) solid cast rotor windings; (5) a rotating labyrinth seal on the shaft; (6) permanently-numbered leads; (7) easy access conduit box; (8) a pressure-sealed rubber grommet is used to seal the lead entrance to the stator, and a gasket separates the two halves of the larger diagonal split box; (9) water shedding stator windings; (10) the split-hub "Textolite" plastic fan is corrosion-resistant and provides a "jet" ventilation system for cooling the frame.

After the first of the year, the motors will be available in 1-, 1½- and 2-hp. sizes at 1800 r.p.m., in horizontal, drip-proof, and totally-enclosed fan-cooled models, and a complete line of gear motors. Eventually these motors will be available in sizes up to 30 hp. Other types planned for production during 1954 include vertical, single-phase, wound rotor, explosion-proof, multi-speed, face-mounted, and flange-mounted models.

Open-Top Scrapers

LETOURNEAU-WESTINGHOUSE CO., Peoria, Ill., has announced a line of open-top, tractor-drawn, rubber-tired scrapers ranging in capacity from 10.5 to 28.5 cu. yd. The scrapers, "Carryall" Models 0-14, 0-19, 0-23, and 0-35, are designed for use with tractors of 70 hp., 75 hp., 80 hp., and 100 hp., respectively. The scrapers are of welded construction throughout and are operated by a double-drum power control unit. Other features include a self-sharpening, reversible blade; replaceable side runners; oil-sealed, heavy-duty roller bearings; and heat-treated cable sheaves for correct wire rope support.



Open-top, rubber-tired scraper

Crane, Shovel, Dragline

UNIT CRANE & SHOVEL CORP., 6411 W. Burnham St., Milwaukee 14, Wis., has announced four engineering developments as follows:

A heavy-duty undercarriage, for Model 1520 self-propelled mobile crane, has a double beam arrangement, of the walking beam principle, for maximum wheel spindle support. Each wheel carries its proportionate load without weight transfer from one axle to another, thus eliminating tandem rear axle distortion and assuring maximum traction on uneven ground.

Lightweight, Alumetallic clutches, as optional equipment on Models 1020 and 1020A shovels or draglines, are

Self-propelled mobile crane with heavy-duty undercarriage has lifting capacity of up to 20 tons

said to cut down bearing wear and momentum when the swing cycle is reversed.

An all-welded "trenchoe" boom with the "Gooseneck" or offset design has been added as the standard "trenchoe" attachment for Model 1020 shovel.

Chrysler torque converters are available with the industrial gasoline engines in the ¾-cu. yd. capacity equipment, and the ½-cu. yd. capacity diesel-powered units have torque converters as optional equipment.

Shovel Loader

BAKER-LULL CORP., 314 W. 90th St., Minneapolis 20, Minn., has introduced the four-wheel drive, 1½-cu. yd. capacity Shoveloader, featuring a 3 to 1 planetary type gear reduction in each wheel and four-wheel power steering. The rear axle has 23-in. oscillation to provide full ground

Shovel loader featuring four-wheel power steering

pressure on rough ground, and hi-flotation type, low pressure, traction tires are used on all four wheels.

The loader has a lifting height of 10 ft. 10 in., a forward reach of 5 ft. 10½ in. ahead of the tractor, and a 25-in. downcrowd. Jointed arm construction allows the bucket to be tilted back as much as 30 deg. at ground level for natural digging action. The loader is available with either a 77-b.hp., 2100-r.p.m. diesel engine, or a 93-b.hp., 2100-r.p.m. gasoline engine. Accessories available include a 1¼-cu. yd. material bucket, a 2½-cu. yd. snow or coal bucket, material handling forks, lifting crane, backfill blade, and a standard bulldozer blade.

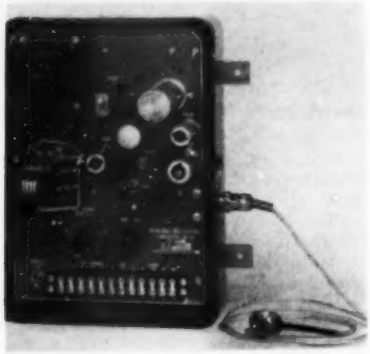
Bin Level Control

ROBERTSHAW-FULTON CONTROLS CO., Fielden Instrument Div., 2920 N. Fourth St., Philadelphia, Penn., has developed the "Tektor" bin level control with no moving parts. The simplified electronic circuit operates by a change in the electrical capacitance of the electrode caused by the approach of flowing material. The instrument provides control as close as 1/16-in. of liquid, divided solid, interface, conducting or non-conducting, wet or dry materials. Electrodes are available for use with pressures up to 2000 p.s.i., and temperatures up to 1500 deg. F. Models 101 and 102 are low and high level models, respectively. The unit utilizes a trimmer adjustment, accessible without removing the cover, and a single radio tube.

Electronic level control has no moving parts

Vibration Relay

GENERAL ELECTRIC CO., Special Products Section, Schenectady 5, N.Y., has announced a vibration relay and component accelerometer, a device



Vibration relay for large rotating equipment

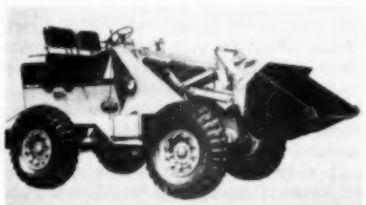
which initiates a signal when excessive vibration due to unbalance occurs in large rotating equipment which is left unattended for long periods of time. The relay has an operating range which allows its use at speeds from 300 to 18,000 r.p.m. to energize a warning-alarm, corrective or shut-down devices at pre-set vibration acceleration values up to 20 g. Design features provides ease of calibration in the field and safe installation where dust conditions exist. A fail-safe feature gives warning when the device itself fails, due to filament burn-out of amplifier tubes, fuse failure, etc., and will cause the normally energized relay to be de-energized until the cause of failure is corrected.

Crawler-Mounted Excavator

KOEHRING CO., Milwaukee 16, Wis., has introduced a crawler-mounted excavator, Model 205, with a lift capacity rating from 7¾ to 10 tons and a dipper capacity for shovel and hoe of ½ cu. yd. A simplified upper machinery arrangement which involves only two horizontal shafts is included among its features, as well as fully enclosed gears, automatic brakes, adjustable hook rollers and an electric dipper trip. Self-cleaning crawlers with interchangeable shoe widths of 16, 20 and 24 in. are provided for the excavator which may be converted from shovel to hoe, crane, dragline, clamshell or magnet through the use of attachments.

Front-End Loader

BAKER-LULL CORP., 314 W. 90th St., Minneapolis, Minn., has brought out a front-end Shoveloader with a 6000-lb. or 1½-cu. yd. capacity, four-wheel drive and power steering, parallelogram loader action and a 100-in. wheelbase for stability. A 23-in. oscillation of the unit's rear axle keeps all four wheels in ground contact on rough terrain, and the five-speed forward or reverse transmission coupled with shuttle gear transmission permits quick change of direction. Operator safety is taken into consideration by locating the seats at the rear and above the engine, away from all moving parts. The unit is designed to down-crowd 25 in. below tractor level, and the parallelogram design of the loader mechanism keeps the blade or fork at the same angle regardless of the loader's attitude. Power is supplied by a 6-cylinder Hercules engine, either 93 hp. gas or 77 hp. diesel, each rated at 2100 r.p.m., and the loader mechanism is powered by a 1200 p.s.i. hydraulic system with gear-type hydraulic pumps. Accessories available with the equipment include

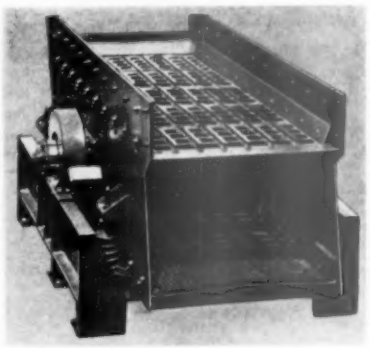


Loader may be powered by either a 93 hp. gas or 77 hp. diesel engine

a 1¼-cu. yd. and a 1½-cu. yd. material bucket, a 2½-cu. yd. coal and snow bucket, lifting forks and bulldozer.

Vibrating Screens

PIONEER ENGINEERING WORKS, INC., Minneapolis 13, Minn., has redesigned the "Mesabi" type vibrating screens to give rugged service, greater durability and more efficient operation. The screens are available in single- and two-deck types in the following sizes: 4 x 10 x 12 ft.; 5 x 10 or 12 x 14 ft.; and 6 x 12 x 14 ft. In the two-deck scalping screen, the top deck is ½-in. punched plate and the

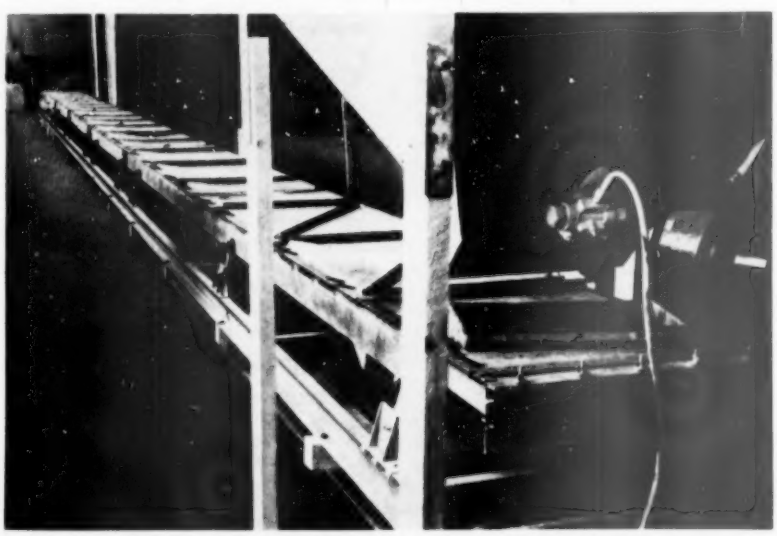


Scalper has 18-in. car channel

bottom deck is wire mesh. The single-deck scalper has a ¾-in. punched plate deck. The main frame on the 4-ft. screens has been redesigned to include an 18-in. car channel reinforced with 8-in. cross beams while the 5- and 6-ft. wide screens include 18-in. I-beams reinforced with 8-in. cross beams. The wire mesh screens in the 5- and 6-ft. wide sizes are equipped with side clamp bars and a center clamping strip to hold the screen securely in position and reduce metal-fatigue failure.

Vibrating Conveyor

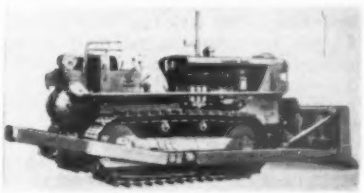
GIFFORD-WOOD CO., Hudson, N.Y., is supplementing its line of engineered conveying equipment with "Oscillveyors," vibrating conveyors for handling materials requiring closed housing transportation. The conveyor, oscillated with a continuous series of forward-and-up, downward-and-back movements, moves the material by throwing it forward short distances in making its cycle. The company maintains an experimental laboratory in which it will conduct tests with various materials to determine correct vibrating conveyor design for the product in question.



Conveyor vibrated by electric motor and specially-designed links

Pusher Tractor

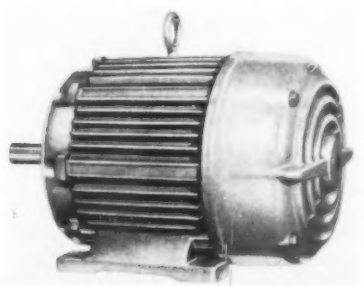
CATERPILLAR TRACTOR CO., Peoria 8, Ill., has brought out the D8 pusher tractor, a modified version of the D8 tractor, for heap loading large scrapers. The unit has a D13000 engine, modified to produce 150 drawbar horsepower at 1200 r.p.m. Some of its features include oil-type flywheel clutches, and increased weight of 50,025 lb. to help provide pusher balance and traction. A tandem pusher frame attachment permits power transfer from one tractor to another through the track roller frame to avoid the harmful stresses to the lead tractor's final drive. Bulldozer and cable controls permit inline pushing action.



Tractor with tandem pusher frame

Electric Motors

THE LOUIS ALLIS CO., Milwaukee 7, Wis., recently announced the "L.A." line of electric motors in open drip-proof, totally-enclosed, fan-cooled and explosion-proof enclosures in ratings up to 40 hp. at 3600 r.p.m. The motors were redesigned to meet N.E.M.A. frame and rating standards, reducing the size and bulk of the cast-iron housing and motor bearing brackets without sacrificing mechanical strength, and providing a lighter and more compact unit for each horsepower and speed.



Totally enclosed, fan-cooled and explosive-proof motor

Utilizing more power in the smaller unit has been accomplished by the use of larger lamination diameters and longer stacking with shorter coil ends. The new line is said to deliver the same performance as the older units with comparable starting and breakdown torque, power factor, temperature rise, and service factors.

The bearings are factory lubricated with an ample grease storage reservoir. A grease fitting may be supplied as an optional feature to permit adding grease if desired. Back-end bearings are locked in place by a bearing cap, and locknuts on the motor shafts minimize end-play. Bearing brackets also have cast-in slots to allow easy removal for inspection.

The open, drip-proof constructed motors have single-end ventilation—the cooling air enters at one end, passes entirely through the motor, and exhausts at the other end. This eliminates ventilation openings in the housing and provides a well-enclosed motor suitable for any mounting position. Both open and enclosed motors have a split-conduit box which separates into halves for easy electrical connection. A lead identification spacer inside the box provides permanent and positive identification of the various leads, even if the lead tags are lost. An alternate conduit arrangement for the open, drip-proof motor permits omission of the conduit box entirely where the motor must be used in crowded quarters.

Air Compressor Rentals

AIR COMPRESSORS & MOTORS, INC., 13710 Aspinwall Ave., Cleveland, Ohio, has announced a "stand-by" service which offers prompt installation of replacement air compressor equipment on a short-term rental basis for the period required to repair or replace the original equipment. The company maintains a stock of new and reconditioned air compressors of various makes and capacities to fit different type installations. Also available is an extensive supply of accessories, parts, etc.

Dump Body

THE GALION ALLSTEEL BODY CO., Galion, Ohio, has announced Model 12-3, an 8-ft. x 78-in. x 90-in. dump body constructed of high tensile steel with pyramid side braces and box-type, rear corner posts. Front and rear gussets are provided for side-board installations. The high tensile steel plate floor is submerged-arc, automatic seam welded to eliminate weld obstructions on the floor surface, and has a minimum yield point of 50,000 p.s.i. The floor is built with a 2-in. radius allowed between the floor and body sides to facilitate faster, cleaner load discharge. The heavy-duty, double-acting tailgate is reinforced with vertical type braces. Spreader device and chains are available as standard equipment and extra equipment such as a cab protector, removable steel side boards, center partitions, etc., is also available.

High tensile steel dump body

Rock Drill

EUGENE ENGINEERING CO., 1485 W. First St., Eugene, Ore., has brought out the "Eeco" tractor-mounted rock drill. The unit, comprised of a compressor, drill and feed, air lines and motive power, is complete in itself; it travels and drills with its own power. The 20-ft. 6-in. feed assures continuous drilling for 20 ft. with one steel. A flexible boom is designed to drill any degree of a circle on either a horizontal or vertical plane. The drill is operated from a movable control panel, allowing the operator to stay away from the face. It is available as a complete unit including the tractor, or for mounting on a tractor.

Tractor-mounted rock drill drills any angle of a circle on a horizontal or vertical plane

Stripping and stockpiling is done by two crawler tractors

Gas-Gasoline Engines

INTERNATIONAL HARVESTER CO., 180 N. Michigan Ave., Chicago 1, Ill., has added seven 6-cyl. models to its gas-gasoline power unit line to provide a total of 12 engines ranging from 16.5 to 200 net maximum hp. The seven valve-in-head power units and horsepower ratings are as follows: U-1091 (natural gas), 180 hp., 1375 r.p.m., or up to 200 hp., 1600 r.p.m. on factory-approved applications; the following units with 1800 r.p.m.—U-450, 102 hp.; U-406, 91 hp.; U-372, 83 hp.; U-269, 62 hp.; U-240, 55 hp.; and the U-220, 50.5 hp. Basically, the U-1091 power unit and the UD-24 diesel power unit have common components. Principal differences are a different cylinder head and elimination of the fuel injection system. The U-1091 is also equipped with lower

Removing overburden with crawler tractor

compression pistons, a large updraft carburetor, magneto, spark plugs, and a gear-driven, variable-speed governor. The six other power units have International truck engines, and are equipped with updraft carburetors and variable-speed, flyball-type governors, but can be furnished with downdraft carburetors.

Heavy-Duty Dump Body

THE GALION ALLSTEEL BODY CO., Galion, Ohio, has announced production of a "rock" type dump body for extra-heavy-duty hauling of abrasive materials. The "rock" body sides fold into the body floor at a 45-degree angle to prevent the materials from lodging in corners. This angle is reinforced with flat 45-degree steel plates at load-spaced outrigger-type cross-members, and the body floor is rein-

"Rock" type dump body with scow-type rear

forced with a 2-in. hard wood liner inside the floor shell and wear plate. A 15-degree angle scow-type rear end eliminates the need for a tailgate and packs the load firmly in place. Another feature is the "Distorber" mounted on each side of the truck body and hoist frame to absorb warp and strain. The body is constructed throughout of high tensile steel plate and features extra wide box-type side bracing, both horizontal and vertical, on the head sheet and sides.

Three-Way Truck Hoist

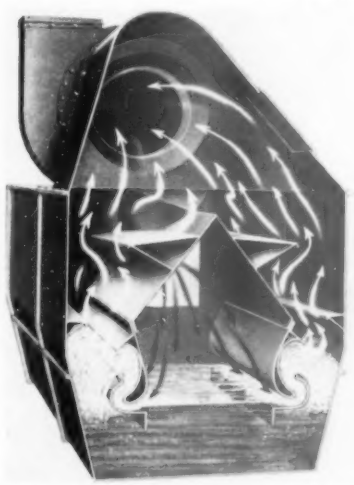
NORWELD, INC., Loveland, Colo., has introduced a three-way hydraulic truck hoist with a capacity of up to 10 tons. Installation of the hoist on a 1½- or 2-ton truck converts it into a dump truck which will dump to the right, left or off the end. Anchor pins placed in position on either side or at the end of the hoist frames allow heavy-duty twin hydraulic cylinders to lift the truck bed to dump in a choice of the three positions. The bed can also be locked for rough hauling of shifting loads. An alternate arrangement of pivot hinges enables the truck bed to be dumped any of the three ways in about 30 seconds changing time. The hoist is available as a complete, self-contained unit ready for mounting on the truck bed, and has structural steel stringers and under-bed reinforcing which are to be bolted to the bed and truck frame. A ball bearing-mounted gear pump and cab controls complete the unit.

Laboratory Dry Blender

THE PATTERSON FOUNDRY AND MACHINE CO., East Liverpool, Ohio, has introduced the Type "L-P" laboratory dry blender, designed for research and development of a range of blending problems. The blender is made of clear, rigid plastic to permit studying the effects of raw material consistency changes, density differences, etc. It is complete with a lightweight aluminum frame and integrally-mounted motor drive. With a 12-in. diameter, it has a batch or working capacity of 0.31 cu. ft., and can blend materials weighing up to 100 lb. per cu. ft.

Dust-Collector

AMERICAN AIR FILTER CO., INC., Louisville 8, Ky., has announced Design 4, Type N Roto-Clone dust collector, a hydro-static precipitator which separates dust from the air by means of an S-shaped water curtain. It is available in three basic arrangements, identical in operating principle but different in hopper design and means of sludge removal. These arrange-

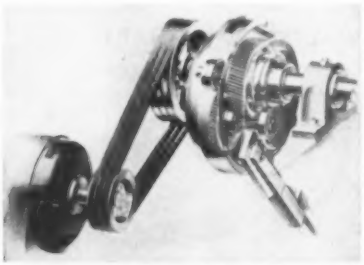


Hydro-static precipitator separates dust from air by means of S-shaped water curtain

ments provide manual cleanout, continuous drain, or sludge ejection by flight conveyors. Features of the dust collector include non-plugging water entrainment separators, heavy sludge ejector mechanism, and sectional construction to permit field conversion from one arrangement to another. The unit is available in capacities ranging from 1000 c.f.m. to 48,000 c.f.m.

Speed Reducers

AMERICAN PULLEY Co., 4200 Wissahickon Ave., Philadelphia, Penn., has introduced a 13 to 1 ratio series of shaft-mounted speed reduction units under the name "Shaft-King." The units feature V-belt drives to cover



Shaft-mounted reducer with a 13 to 1 ratio

a variety of slow-speed equipment, and are adaptable to shaft-sizes up to 3 11/16 in. Gearing and bearings are continuously splash-lubricated from an oil reservoir in the lower third of the three-wall housing, while a patented concentric shaft design places both the input and output shaft above the oil level. Additional features include a leakproof, anti-friction oil sealing system, interchangeable split tapered bushings, and the use of both ball bearings and tapered roller bearings. For protection against sudden overloads or jamming, the unit may be equipped with an optional torque-arm overload release, and an optional internal backstop is available as a precaution where reversing must be prevented.

Ribbed Conveyor Belt

THE B. F. GOODRICH Co., Industrial Products Div., Akron, Ohio, has developed "Riffle Grip," a rubber conveyor belt with a surface which can shed or retain water with a simple adjustment. The belt cover design has molded rubber ridges ½ in. high formed in a continuous series of chevron patterns several inches apart. Operating on a predetermined conveyor incline angle, with belt idlers also placed at the angle, the chevron-like ridges channel water to the belt

Conveyor belt designed to either shed or retain water

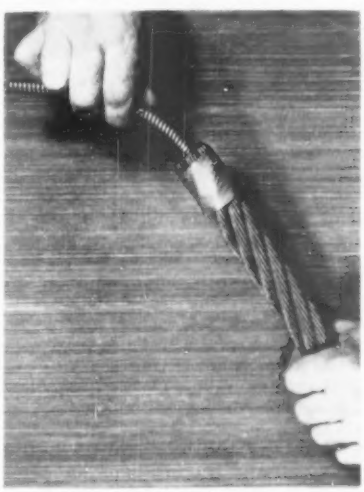
edges where it flows off. Adjustment of the incline angle and the idler angle changes the surface into a series of horizontal carrying ribs which hold water on the belt and permit even distribution of moisture throughout the material. Adjusted this way, the belt may be used in conveying wet sand and gravel up steep inclines for stockpiling, and for handling ready-mixed concrete and similar moist materials.

Drilling-Testing Firm

THOMASVILLE DRILLING & TESTING Co., INC., with headquarters in Thomasville, Penn., has been formed by E. E. Cooke, president of the new company; H. H. Banker, vice-president; and R. W. Gobrecht, treasurer. The company, concentrating its activities in the East, tests for minerals and foundations, and conducts laboratory work and chemical analysis. Equipment for all types of core drilling, with experienced operators, are available, according to Mr. Cooke.

Wire Rope

JONES & LAUGHLIN STEEL CORP., Gateway Center, Pittsburgh 30, Penn., has developed a wire rope, known as



Wire rope with steel spring core

the "Spring-Center," with a coiled steel spring core to provide flexibility and to resist crushing. It is available in diameters of ⅞, 1, 1⅛ and 1¼ in.

Suspension Bearing

GENERAL ELECTRIC Co., Schenectady 5, N.Y., has developed a traction motor suspension bearing for the GE-752 motor, which is said to enable locomotives to operate between monthly inspections without the addition of oil to the axle caps. Oil return grooves in the bearing lining permit the return of excess oil to the cap, thus reducing oil consumption. The bearing design is such that old bearing linings may be modified to provide the same benefits.

Side-Dump Body

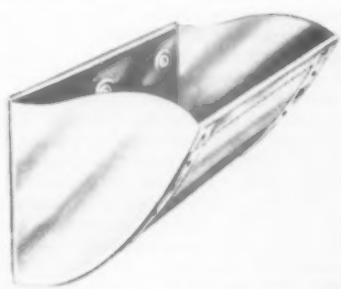
THE GALION ALLSTEEL BODY Co., Galion, Ohio, has introduced the "Galion Side-Dumper," a side dump body with double lift arm action for

Side dump body, 10 ft. long with 8-ton lifting capacity

standard dump truck applications. The body is constructed throughout of 12-gauge high-tensile steel with box type bracing, and hydraulic hoists control the double lift arms. The body may be designed to dump either to the left or right with a dump angle of 45 deg. Four forged steel hinges form a pivot point to eliminate warp and twist to the truck frame when the body load shifts. The double-acting tailgate swings on steel hardware. The unit is available in lengths from 8 to 10 ft.; capacities, 3 to 6 cu. yd.

Elevator Buckets

FORT WORTH STEEL & MACHINERY Co., 3600 McCart, Fort Worth, Texas, has resumed the manufacture of the "Hi-Cap" line of high speed elevator buckets for handling powdered or granular free flowing materials which are not excessively abrasive. The elevator buckets, made of heavy gauge, cold-rolled steel, are suitable for replacement purposes or new installations in chain or belt conveyors. The body shape provides for maximum load and clean discharge at varying belt speeds. Tapered ends decrease friction on pickup and discharge, and



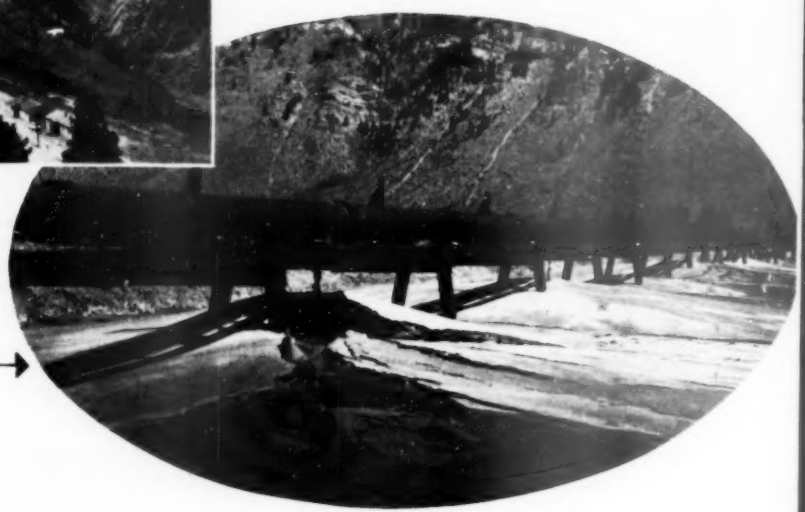
High-speed elevator bucket for chain or belt elevator installations

allow nesting of buckets for shipping and storage. The ends and body are spot welded so as to remove sheet stress from the welds.

Control Disposal of TAILINGS From Crushing Operations To Prevent Stream Pollution

By WALTER B. LENHART

Mountainous terrain in Colorado where New Jersey Zinc Co. plant is located. Notch Mountain in background is over 13,000 ft. in elevation. In the foreground, to the left, is the shaft and timber yard. The mill and crushing plant is underground, approximately under the hill at the far end of town



Holes in wood pipe carrying tailings are drilled for 1-in. pipe nipples to take wear. There are about 40 holes in the line spaced from 10 to 20 ft. apart. Area fills up rapidly under the header pipe

MANY OF THE BASIC FEATURES OF tailing control have been discussed in the series of articles published by ROCK PRODUCTS during the past two years. This series started because of a need by the crushed stone producer of more knowledge of how to control the tailings, or rejects from his washing plant because stream pollution is prevented by law in most states. Even though most of the eastern states have had anti-stream pollution laws on their books for decades it has been during the last few years that these laws were beginning to be enforced.

Stream pollution from all sources is a vital subject to all crushed stone and sand and gravel producers. With this need in mind, the writer made a very extensive trip through the mining districts of the far West, noting how the metal mining operations controlled rejects, for these operators had to face the problem decades ago. This problem in their case arose because of a need to recover water, and to eliminate stream pollution.

Stream pollution due to chemically inert solids is the only concern in this article. In the writer's 30-odd years of travel and observation, he has yet to see a rock processing operation—sand and gravel, crushed stone, etc.,—where any solids went into a drainage area that could, by the most imaginative, be considered chemically active, and because of these chemicals, (soluble or insoluble), be harmful to animal life. Solids that flow from these plants are inert and in themselves harmless; however, they can build up bars that could interfere with water transportation, or the fine silt may get into a domestic water line and interfere with the lady's washing, but otherwise the solids only make the water *look* bad. One can argue both pro and con as to the harm to fish life by muddy water from rock processing plants. Be that as it may the trend is more and more towards not letting *anything* get into streams that will cause discoloration. This means tailing control at the plant.

Since this series on tailing control was started, specifications in some states were changed to require that all rock be washed or rinsed. This includes crushed limestone. As the fines from the dry limestone plants were sold mostly for agricultural limestone, washing the stone upset normal operations for the agstone had to be recovered reasonably dry. Introduction of water to the screens meant that some of the fines would be carried away as tailings. Stream pollution was not possible so they started thinking in terms of tailing control. We could name at least a dozen. Some producers held to the idea that to retain tailings, " . . . all you have to do is throw up a dike and make a pond. When the pond is full, bail it out—or build another." However, these operators quickly ran into trouble. The pond filled up faster than expected. This stemmed from a lack of knowledge of the amount of solids per day (or month) that was going to the pond, or the gallons of pulp sent to the pond. One operator figured he had a pond that would " . . . last the season." About one-third through the season the pond was full, so he built another. Examination of the fines in the first pond showed there were about 15,000 tons of good agstone that should have been recovered ahead of the pond. Maybe not a total loss but economically, poor practice. This is just one of many typical examples.

If the problem of retaining tailings is faced there are certain basic facts that must be understood. The first is that it is going to cost some money—a lot of money if not started right, and carried out right; a fraction, if done right. If it is believed that nothing but clear water will flow out of the tailing ponds for the next 10 to 50 years without it costing something, these operators are in for an awakening. They might do it at low cost for a year or so and then find that the plan did not work continuously. By that time it may be too late. If a tailing control program is contemplated, the first basic requirement is to first estimate the number of years of operation at the site. Set a figure even if it is on the high side, say 50 years. Next, determine the percentage of solids going to the proposed pond, and with the gallons per

Tailing control methods used by New Jersey Zinc Co., at the Gilman, Colo., plant serve as an excellent example of operations in the West where colder temperatures are encountered

Mill rejects (tailings) are transported over three miles in concrete pipe and wood stave pipe to the disposal area. Creosoted timber trestles are up to 55 ft. high

day, calculate this back to tons of solids per day. Now one can calculate the tons in 50 years, and convert this into "volume of solids." No doubt most operators will be amazed at the great size of the pile of rejects. Begin to look around for an ideal tailing pond site—large relatively flat land that is practically worthless. This is not often easy to find so a smaller area must be used. To get the 50 years production in that area, a dike 100 ft. high might have to be built to retain the fine rejects. How is one going to build a safe retaining dike 100 ft. high out of the rejected solids? Well, that is why this writer went to the western mines, for they are building dikes up to 150 ft. high; all out of minus 65-mesh material, or in that range. But to build such a dike, the most important essential is to *start right*. If a wrong start is made, it may not be corrected ten years from now. One can next make a mental image of what a tailing pond dike, 100 ft. high, made of fine rejects would look like 50 years from now. The pile may be as much of a public nuisance as the former muddy water, for the downstream face of the pile will then be dry fine sand and when the wind blows up the ravine, dusting can be a serious aftermath. This brings us back to the gradation of the sand making up the outer berm. What is the better gradation, having in mind stability of the dike, drainage of excess water out of the dike so as to get that stability? Drainage of some moisture into the dike so that it won't eventually become just a pile of dry sand? Clay content of the dike so as to aid these factors, and dusting?

One western mining company is currently employing a soil stabilization expert, a Ph.D., to study the basic requirements for a dike for tailing control. They are looking decades ahead for as their tailing pond grows higher and higher, eventually it could become a menace to life below should it fail. Don't dismiss tailing control as a minor subject as an overnight injunction can shut down the plant and a permanent one can close up your business.

Gordon Craig, mill superintendent, looking at the clear-water effluent from tailing pond

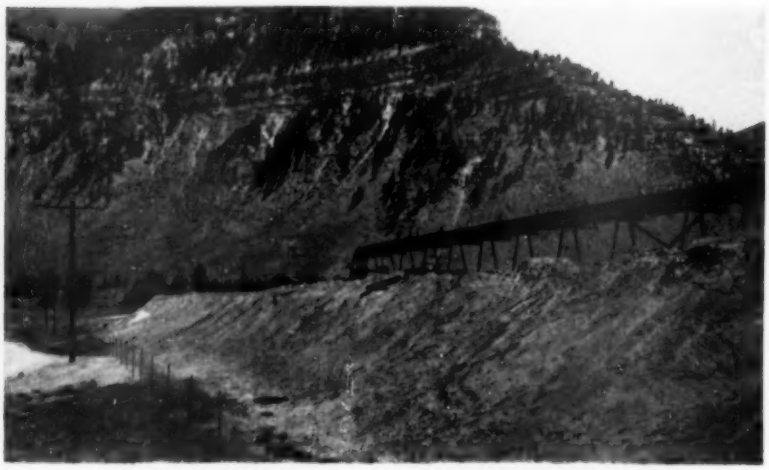
How New Jersey Zinc Solved Problem

IN THE SERIES OF ARTICLES published during the past two years on tailing control, the information developed from mining and milling operations in the dry, hot, Southwest. The point was then raised that most of the rock products industries were in a colder climate, and readers asked for more information on how to handle plant rejects during colder weather. This took another travel approach to the problem so some of the metal mines and mills in cold climates were inspected. The first of these was the New Jersey Zinc Co.'s operation at Gilman, Colo. The selection of this operation appeared to be very appropriate for the mining and milling operations are conducted in the heart of Colorado's scenic empire. Trout fishermen dot every stream. The water is often used for domestic purposes further down stream, so stream pollution laws are strictly enforced as to solids in suspension, sewerage or chemicals content that come from industries.

Mill Underground

Gilman is about 25 miles north of Leadville in the canyon of the Eagle river. Snowclad mountains flank the area, some rising higher than 13,000 ft. As the immediate terrain is steep and rugged, no site suitable for a mill was available, so The New Jersey Zinc Co. excavated an underground room 330 ft. long, 52 ft. wide and from 22 to 56 ft. high—all in solid granite—and has the mill well underground. Additional underground rooms in this area are provided for two shops, two mill storage rooms, reagent and mixing rooms, primary and secondary crushing plant, blower room, a concentrate drying room, and four ore pockets. A service incline on an 18-deg. slope takes up one side of the main mill room that extends from the main ore haulage level at the top of the mill to the railroad loading dock at the toe. The vertical distance between these two levels is 116 ft. The choice also qualifies as a cold climate for the average mean year-round temperature is exactly 32 deg. F. The elevation is 9000 ft. and snow often piles up to a depth of 6 ft. or more on the level. At night the winter temperatures drop to as low as 30 deg. below zero, with temperatures in the 15 deg. below zero range for extended time periods. Controlling the rejects from this operation at the rate of 1200 tons per 24-hr. day under such conditions presents a few problems that may be of interest to ROCK PRODUCTS readers.

Ores are being treated at Gilman primarily for the lead and zinc content. The ore is ground to roughly 95 percent minus 65 mesh and, after removing the lead portion of the ore by froth flotation, the zinc portion is recovered. These two concentrates are shipped to lead and zinc smelters, re-



The outer face of the dike or berm is kept at about 45 deg.

spectively, for further processing. The mill rejects, or tailings, are sent to the pond. The mill tails have the following screen analysis:

Mesh	Percent Retained	Percent Cumulative Retained
plus 48	1.6	1.6
65	3.1	4.7
100	7.2	11.9
150	14.1	26.0
200	18.5	44.5
270	11.0	55.5
minus 270	44.5	100.0

The mill tailings average 22 percent solids but this is lowered to 6 to 7 percent solids by mine water and other sources. A considerable volume of water is added to help keep the line sluiced out and to prevent sanding up. A small volume of effluent from the sewage treating plant at Gilman is also added to the tailing pond line so that the total volume going to the tailing pond is in the 2000 g.p.m. range. The mill sends 700 to 800 g.p.m. of the total, the mine varies from 200 to 500 g.p.m. and about 500 g.p.m. is pumped into the line for sluicing purpose. This contrasts with the mills previously discussed where thickeners were usually used to thicken the mill tails before sending them to the pond.

Dam Built Up By Tailings

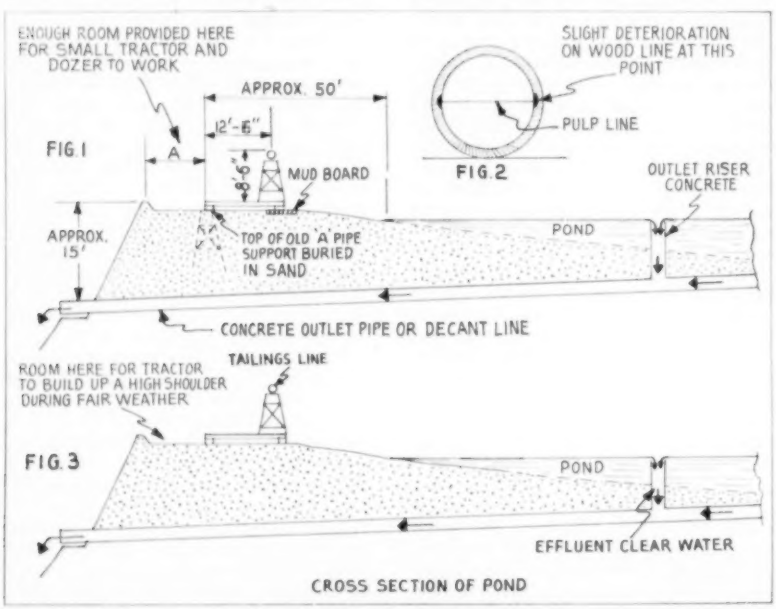
As there was no site immediately available for a tailings disposal area, The New Jersey Zinc Co. had to transport the rejects for over two miles to the pond. For about half this distance, 18-in. concrete pipe, buried below ground, is used. The remainder of the line is 14-in. wood pipe. For a considerable portion of that distance, the wood pipe is carried on trestles that are up to 55 ft. high. The higher parts of the trestles are of creosoted poles with some of the lower bents of 6 x 6's. Over the pond area the bents are 4 x 4's.

In the mill a rather complex flotation procedure is followed. In one section of the mill the tailings have a pH of 11.0 which is distinctly alkaline. In another section of the mill, an acid circuit prevails and rejects from this section are in the 5.0 pH range. To this is added 10,000 to 12,000 g.p.d. of chlorinated sewage effluent and the mine water. The tailings water contains relatively large amounts of zinc sulphate, magnesium, copper and iron sulphates and minor amounts of flotation reagents which all tend to neutralize each other in the line and/or pond. The net result is that the pH of the overflow at the tailing pond is 7.0 or neutral.

While the ore is ground relatively fine, as will be seen by the screen analysis, the dam or dike forming the tailing pond is built only of the coarser portion of this material. The rejects are high in pyrite with a sp. gr. in the 4.5 range. They settle reasonably fast and form a stable dam. The concrete and wood stave pipe line extends from the mill with a gravity flow all the way to the pond. The concrete pipe section follows the grade of the railroad track alongside and has a fall of 3 ft. per 100 (3 percent). The next section is wood pipe and it has a slope for a considerable distance of 1½ ft. per 100 (1½ percent) and the lower end of the line has a fall of one percent. If the grade is lowered to 0.9 percent it is considered critical as regards sanding up. No pump is used any place in the system of tailing control, other than the sluice water.

The tailing operations started in 1928-29. The mill did not operate in the period 1931 to 1941 and the line therefore was not used except for mine water. Newer sections of the line, i.e. parts of the wood line, went into service in 1946 and have been in use practically continuously ever since. The concrete pipe used from 1928 to date shows no signs of wear and appears to be lined with a slime coating. The older sections of wood pipe show some signs of deterioration at the pulp line inside the pipe and this is attributed to wet and dry and freezing and thawing actions at this point. (See sketch Fig. 2). The new wood sections, i.e. those in service since 1946, show little or or no wear.

As over two miles of the wood line pipe are above ground, considerable apprehension was first expressed because of the extremely cold winter nights, so for a period of time, temperature readings were taken of the pulp at the mill end of the line and again at



Figs. 1 and 3: Cross sections of pond showing details of berm, pipe line supporting tower, and outlet riser. During fair weather dam is built. In freezing weather all drop holes are plugged in dam area, and solids are dropped behind natural morains where there is no danger of a washout after the pulp thaws. Fig. 2: Wood stave pipe details

the discharge point. It was found that the difference in temperature was only 2 deg. F. However, it should be known that in the rod and ball mill set-up at the mill, the pulp gains considerable heat. During winter months water from the Eagle River used in the mill has a temperature of 32.5 deg. F. After passing through the pumps and grinding section the pulp temperature is raised to 45 deg. F. Live steam is added to the grinding circuit to raise the temperatures to 65 to 70 deg. F. in the flotation process, for technical reasons. Recently, warm mine water has been substituted for this steam in the mill circuit. Other mine waters, sluicing water, and sewage effluent bring the temperatures back to the 40 to 45 deg. F. levels.

No trouble has been experienced due to the line freezing. However, a word of caution as to leaks in the line during winter operations: the least bit of spray, or drip, quickly forms big icicles and if these leaks are in the higher trestle sections, the weight of the ice formed can cause the line to collapse, so leaks are taboo in the winter months. On the other hand, during the warm seasons a small amount of pulp is sometimes deliberately allowed to trickle to the ground under the trestles. This is with the idea of filling in the area with the heavier and coarser sand so that eventually the pipe line will be on the ground. The practice also anchors the trestle bents and covers the brush around the trestles and reduces the fire hazard. The amount of leakage permitted is such that no liquid ever drains into the river parallel the line. It either evaporates or sinks into the ground.

Controlling Effluent

The area of the pond at the start was 32.8 acres. It is slightly smaller now but well over requirements. The effluent is always clear water and *never* is allowed to run dirty. The pond is oval-shaped, roughly 1500 ft. across and 1800 ft. long. It fits into a small and shallow ravine with a dam at the lower end, and on one side. The end and side dam section is made up of the tailings with no other material added. This is accomplished by carrying the wooden line near and around the outer edge of the dike. Holes are bored in the bottom of the wood pipe every 10 to 20 ft. as desired. The hole is large enough to receive a 1-in. pipe nipple that is carried flush with the inside of the pipeline. Up to 40 of these holes are open at all times. The heavier and larger particles of sand tend to settle in the lower part of the line and flow out these outlets. This material piles up under the pipeline rapidly, especially at the points of early entry. The pipe line around the edge of the pond is carried on a timber trestle that is 8½ ft. high maximum and about 22 ft. back from

Three outlets for clear effluent are provided; two are in use at all times, and arrow points to one not in use

Distance between outer edge of berm and pipe line is kept wide enough for a small tractor and dozer to operate, keeping berm high enough to prevent any pulp from flowing over rim of dike

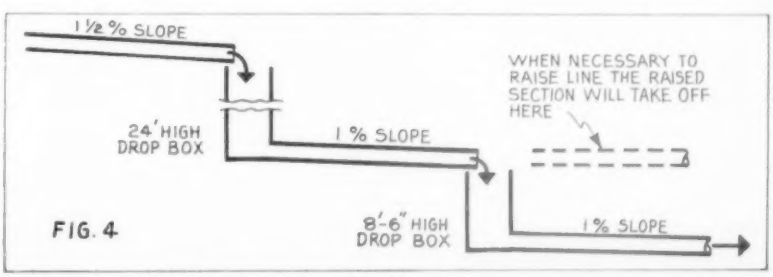

1½% SLOPE
WHEN NECESSARY TO RAISE LINE THE RAISED SECTION WILL TAKE OFF HERE
24' HIGH DROP BOX
1% SLOPE
FIG. 4
8'-6" HIGH DROP BOX
1% SLOPE

Fig. 4: Cross section of two-mile-long pipe line to show how drop boxes are used at points where angle of slope changes or where flow is changed for a right angled bend in pipe line

Horizontal member (left) is fastened to top of buried riser. The new trestle is at right end of the horizontal member. A move inward of 12½ ft. for a rise of 8½ ft. is practiced. Pipe line supports are 4- x 4-in. bents with 2 x 8's for the top cross member which also carries walkway

the outer edge of the dike. During colder weather when icing may start, short lengths of old fire hose are placed over the outlet end of the 1-in. pipe nipples so as to eliminate spraying and consequent icing. Any finer sand and slimes that do not pass out the 1-in. openings are carried from the open end of the main 14-in. pipe line to an open launder and dumped into the pond about 75 ft. back from the berm. The slope of the inside or wet side of the dike is flatter than most, and is possibly in the 3 percent range. This flatness is possibly due to the high ratio of liquids to solids and the resulting sluicing action. One can walk over the dike for a distance of 40 to 50 ft. back from the outer edge of the berm. The material is roughly 70 percent pyrite and/or 40 percent equivalent sulphur. It is a future source of sulphuric acid and small amounts of it have been shipped for that purpose. On drying it presents no dusting problem as a crust tends to form on the surface of the dam.

There are three decant outlets; two vertical risers serve one line and one riser on the other. The decant lines are under the pond resting at near ground elevations and are of 18-in. bell-and-spigot concrete pipe. Only two decant risers are normally in service at one time but the third would probably be in service if a flash flood should occur. This is unlikely here as the drainage area above the pond and into it is relatively small. The risers are of reinforced concrete and are circular in shape. They have an internal diameter of 18 in. The walls are 4 in. thick. As the dam grows in height these risers are extended upwards. They are raised progressively to maintain adequate pond area to prevent a dirty overflow at the risers. When it is necessary to increase the height of the riser, an outer and an inner steel band is placed over the top of the riser pipe. This is done from a small boat and is conducted under shallow water. After the bands are in place they are caulked water tight, the water removed from the concrete form that results and concrete is poured into the space. Reinforcings are carried up with the pour. The concrete is small in yardage and is usually mixed right in the row boat.

The effluent is sampled once per month and is subjected to a bacteria count. The safety engineer for The New Jersey Zinc Co. makes periodic spot checks of the tailing pond effluent as he is also in charge of the sewage purification plant. A Wallace & Tiernan pulsating chlorine gas chlorinator is used in the line and one to two parts per million of free chlorine is residual in the effluent.

One attendant is employed to care for all phases of the tailing operation. He is on day shift only. He lives in a neat cottage near the pond. The mill superintendent is responsible for the 24 hr. operations of the pond. However, by having the pipe line well back from the edge of the berm there is room between the pipe line and the edge of the berm to use a small tractor and dozer to build up the outer edge of the dike. (See Figs. 1 and 3.) Occasionally the operator uses a temporary launder to carry the sand closer to the berm. This permits building up without too much rehandling of a relatively high dike which for safety reasons is advantageous. During winter months a temporary launder can be used to carry the heavier sands away from the berm. This means that during favorable weather periods the berm is built up high enough to carry through cold sessions. (See Fig. 3.)

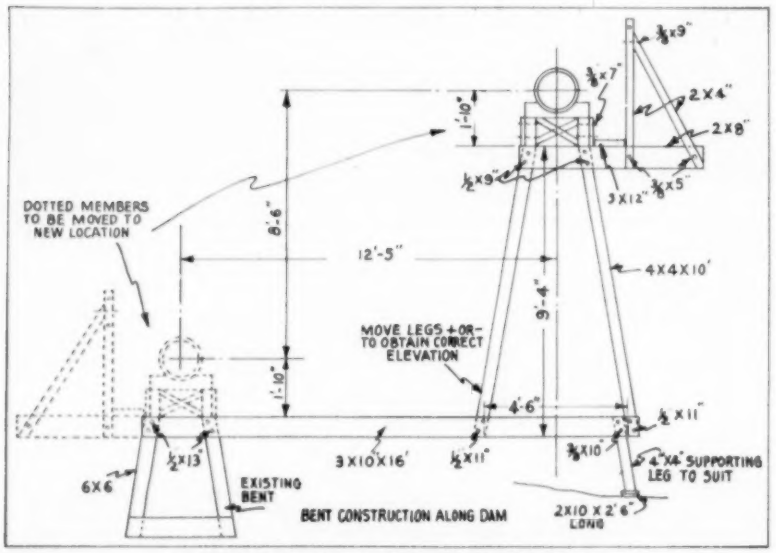


Fig. 5: Details of timber structure supporting the pipe line

How Pipe Line Is Raised

Starting from the point where the concrete pipe emerges from the ground, the first section of 1½ percent grade wood pipe ends at a concrete drop-box serving the next section. This drop-box is 24 ft. high. The second section of 1 percent grade wood pipe ends at an 8½-ft. drop-box, and into the last section of 1 percent slope wood pipe. A drop-box is used to eliminate extra trestle if the ground elevation drops too fast. The pipe line over the berm is also carried at one percent slope. As the pond grows, it is necessary to raise the line. This is once every 5 to 7 years and at the time of inspection the line was being raised. That part of the line around the edge of the pond is the only section necessary to raise. It is raised

(Continued on page 120)

ROTARY KILN LOADING

Third article describes the pilot model kiln used in the study of the passage of particles through rotary kilns

By IRVING WARNER*

THE MATHEMATICS of loading in a rotary kiln of uniform cylindrical design are simple and clear.† The travel per revolution is proportional to the diameter and the slope of the kiln. But if we wish to put any specialized construction in a kiln, the only safe procedure is to try it out on a model.

The model is made of heavy wire screen of small mesh. A wire of about .065-in. diameter or slightly more, with .08-in. opening, will be satisfactory. The use of the wire screen gives manifold advantages:

1. Loading in the kiln and its performance can be observed.
2. Measurements of depth of load and chord length are readily made.
3. Specialized construction can be made in wood or metal and screwed into place through the meshes.
4. Roughness of the screen prevents sliding of the charge.

Fig. 1 is a photograph of the model with extra sections showing, respectively, cross tile construction and a Unax preheater. The drive was removed at the time this picture was taken. Fig. 2 shows a typical design.

Sections are 2 ft. long. The flanges are bolted together and act as tires on the small grooved wheels that support the kiln. Four sections, for a total length of 8 ft., were used. In some cases, fewer sections were used. But when any backing-up problem or "dropping off" effect is being studied, we will use all four lengths for their stabilizing effect on loading.

The separate sections permit disassembling the sections while carefully inserting a plate so as to weigh or measure volumetrically the load in a section. By dividing this measurement by the length, 24 in., we can check the area of the segment or the load where there is special construction.

The kiln is driven by the trunnions on the up-turning side only, from a small laboratory motor with high gear reduction. Speed is unimportant. Our model operates satisfactorily at 2 r.p.m. The only point is to have it slow enough so that the operator can fill a measured vessel and drop it into the kiln once per revolution. If the model revolves too slowly, it simply takes too long to make a test.

The model must be fabricated with great care by a good mechanic as it is difficult to fabricate a true cylinder out of wire mesh. The use of bronze or galvanized mesh facilitates soldering to flanges.

The supporting frame must be stiff so that there is no sag that gives a variable slope in the length. It is important in setting up the model that the slope be made correctly with great care. Flow in a kiln is proportional to slope, and a small error is serious. Note that the frame has jacking screw that permits a true slope on an uneven floor.

As noted, the charge per revolution is used in all our tests. It is necessary, therefore, to prepare small cups that contain the correct volume, when struck level.

A diameter of 9 in. is convenient. But after the model is made, the exact diameter must be determined and this figure used. It might be 8.9 in. or 9.1 in. Always use decimals. Or if

†U.S. Bureau of Mines technical paper No. 384.
*Vice-president, The Warner Co., Philadelphia, Penn.

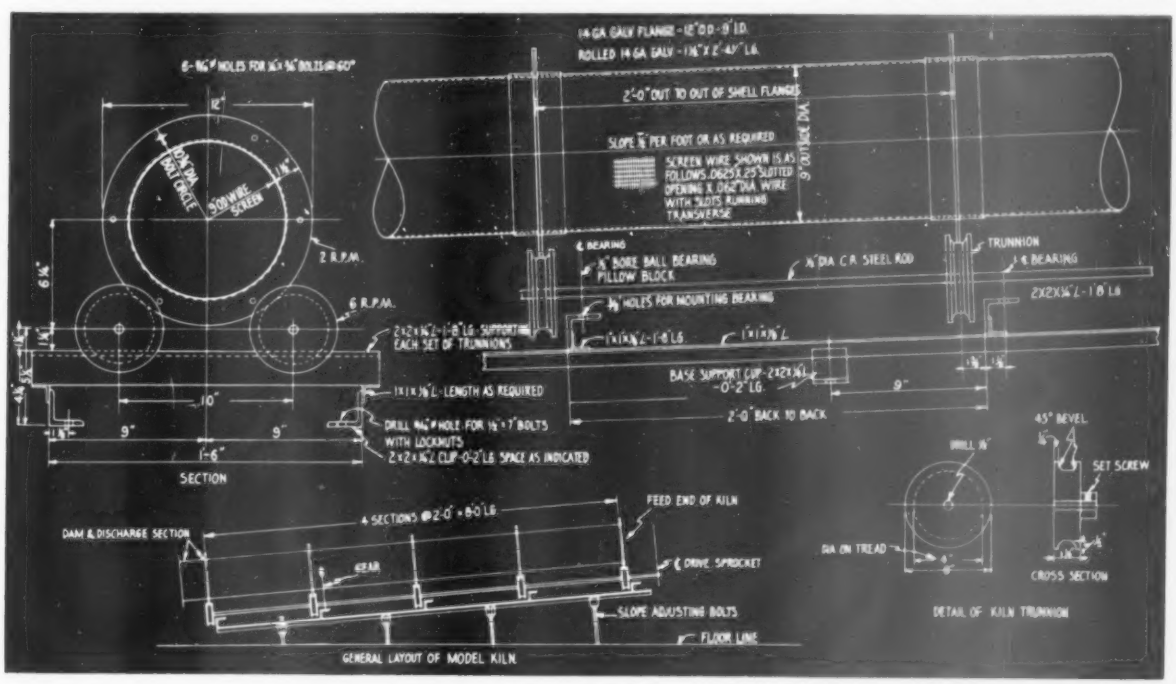

14 GA GALV FLANGE - 12" O.D. - 9" I.D.
ROLLED 14 GA GALV - 1/16" X 2'-4 1/2" LG.
2'-0" OUT TO OUT OF SHELL FLANGES
SLOPE 1/4" PER FOOT OR AS REQUIRED
SCREEN WIRE SHOWN IS AS FOLLOWS .0625 X .25" SLOTTED OPENING X .062" DIA. WIRE WITH SLOTS RUNNING TRANSVERSE
9" O.D. SHELL DIA.
6-13/64" HOLES FOR 1/2" BOLTS @ 60°
12"
10" DIA. PITCH CIRCLE
30 MESH WIRE SCREEN
1/4"
2 R.P.M.
6 R.P.M.
6 1/4"
1/4"
1/4"
2"
4 1/2"
10"
9"
9"
1'-6"
SECTION
2 X 2 X 1/4" L - 1'-8" LG. - SUPPORT EACH SET OF TRUNNIONS
1" X 1" X 3/16" L - LENGTH AS REQUIRED
DRILL 9/16" HOLE FOR 1/2" BOLTS WITH LOCKNUTS
2 X 2 X 1/4" L CLIP - 0'-2" LG. SPACE AS INDICATED
℄ BEARING
1" BORE BALL BEARING PILLOW BLOCK
3/8" HOLES FOR MOUNTING BEARING
1" DIA C.R. STEEL ROD
TRUNNION
℄ BEARING
2 X 2 X 1/4" L - 1'-8" LG.
1" X 1" X 1/4" L
1" X 1" X 3/16" L
BASE SUPPORT CUP - 2 X 2 X 1/4" L - 0'-2" LG.
9"
2'-0" BACK TO BACK
45° BEVEL
DRILL 1/4"
SET SCREW
3/4" DIA ON TREAD
CROSS SECTION
DETAIL OF KILN TRUNNION
DAM & DISCHARGE SECTION
4 SECTIONS @ 2'-0" = 8'-0" LG.
FEED END OF KILN
GEAR
℄ DRIVE SPROCKET
SLOPE ADJUSTING BOLTS
FLOOR LINE
GENERAL LAYOUT OF MODEL KILN

Fig. 2: Elevation and cross section details of pilot rotary kiln

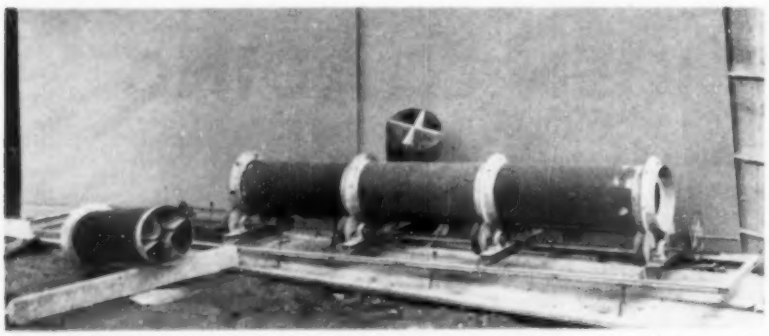


Fig. 1: Model kiln constructed of heavy wire, small mesh screen. Extra sections show cross tile construction and a Unax preheater. Drive was removed at the time photograph was taken

you are scientifically minded, you can do it in centimeters.

Assume the model is 9 in. diameter, and you wish to study a kiln 8 ft. inside the lining (96 in.).

Scale, $S = 96$ in. $\div$ 9 in. $= 10.67$ in.

$S^2 = 114$

$S^3 = 1214$

Suppose you want to put in your 8-ft. kiln a feed of 810 lb. per revolution. At 90 lb. per cu. ft., the charge is 9 cu. ft. Your charge in cubic inches will be:

9 cu. ft. x 1728 cu. in. $\div$ 1214 (S^3) = 12.8 cu. in.

The charging cup must be made accurately to this volume. And if you desire to try out any other loading, a cup of the correct volume must be made.

In starting a test, it is time-saving to overload the kiln for a short time in order to give it an initial charge. Finally, the model must be operated correctly for a period of time until its discharge equals the feed. It is then known to be stabilized in its loading. This may take considerable time if there is any intricate interior construction such as refractory cross tile, internal preheaters of the Unax type, dams, etc.

The charge must be prepared from dried and screened crushed stone. If the stone is too small, there will be a loss through the meshes of the kiln. So figure this from the maximum size you wish to burn, say 2 in.

2 in. $\div$ 10.67 (the Scale) = .187 in.

For this size, use a stone that is passed through a No. 4 screen and retained on No. 8. A smaller stone in the kiln will travel at the same rate, provided it is a clean, sized product.

The modified formula for flow of charge in a rotary kiln as given in my previous articles, can be used on the model. See particularly the articles in ROCK PRODUCTS of May, 1953, p. 72 and August, 1953. The formula is:

$$L = .45\ pd.$$

Wherein:

L = Travel per revolution in inches

p = Slope, say ½ in. to the foot

d = diameter = 9 in. ($R = 4.5$ in.)

$L = .45 \times \frac{1}{2} \times 9 = 2.025$ in.

If the charge per revolution is 12.8 cu. in. as given above, the area of the segment should be:

$$12.8 \div 2.025 = 6.35 \text{ sq. in.} = A$$

The size of the segment can then be figured mathematically by the method and data in the first article on kiln loading in the May, 1953 issue of ROCK PRODUCTS. This is then checked by measurements of the actual segment in the model.

Fig. 3 shows how the chord length is measured by a divider and the depth of the segment measured by a wire inserted through the meshes.

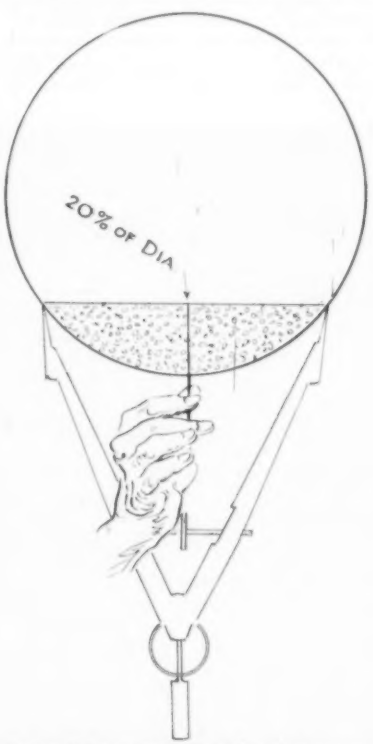


Fig. 3: Showing how chord length is measured by a divider, and the depth of the segment measured by a wire inserted through the screen mesh

For ready reference, the table showing the functions of a circle as given in the article in the May, 1953 issue is repeated herewith.

However, it is not safe to place too much reliance in the actual measurements, particularly in the depth of the load. The length of chord is somewhat more accurate. But thickness of the wire and irregularities of fabricating the cylinder will throw the figures off. The best check, is, as outlined above, to separate the 24-in. sections and actually measure, by volume or weight, the contained load.

Table of Circle Function

Degrees	H/R	C/R	A/R²
66	.161	1.09	.119
67	.166	1.10	.124
68	.171	1.12	.130
69	.176	1.13	.135
70	.181	1.15	.141
71	.186	1.16	.147
72	.191	1.18	.153
73	.196	1.19	.159
74	.201	1.20	.165
75	.207	1.22	.172
76	.212	1.23	.178
77	.217	1.25	.185
78	.223	1.26	.192
79	.228	1.27	.199
80	.234	1.29	.206
81	.240	1.30	.213
82	.245	1.31	.220
83	.251	1.33	.228
84	.257	1.34	.236
85	.263	1.35	.244
86	.269	1.36	.252
87	.275	1.38	.260
88	.281	1.39	.268
89	.287	1.40	.277
90	.293	1.41	.285
91	.299	1.43	.294
92	.305	1.44	.303
93	.312	1.45	.312
94	.318	1.46	.322
95	.324	1.48	.331
96	.331	1.49	.341

Example in using the table:

If $R = 4.5$ in. ($D = 9$ in.) and area of segment in the cited example is $A = 6.35$, then

$$A/R^2 = 6.35/20.25 = .313$$

In the table, we find this to be 93 deg. The chord length is then

$C/R = 1.45$ and $C = 6.55$ in.

$H/R = .312$ (a coincidence and H = 1.4 in.

If the 24-in. section is then carefully cut off with steel plates and its contents measured, it should contain

6.35 sq. in. x 24 = 152 cu. in.

If the model is set up carefully and the work well done, this figure should come out quite exactly.

Then with any construction in the kiln such as a dam or cross tile, the special section can be tested in the same way and the percent increase of load obtained in comparison to the plain cylinder.

Test work of this kind can only be done by a man skilled in ordinary mathematics. A chemist or plant engineer is the proper type of operator. He would be able to constantly check his work mathematically and correct his methods as his experience develops.

Nose rings or dams must be put in to scale. If the kiln has a free discharge, the "dropping off" effect as shown in the Bureau of Mines technical paper No. 384, and as brief-

(Continued on page 122)

Installation and Maintenance of VIBRATING SCREENS

By W. S. SHIRA* and M. P. HAHN*

CORRECT DESIGNING of structural members supporting a vibrating screen are important to its successful operation. Beginning with this important aspect, an attempt will be made in this material to cover those procedures and methods of operation which will result in added benefits to screen users.

Since proper installation is a "natural" first in screen operation, it will be considered immediately. In addition to dead load considerations, the supporting structure must be analyzed for natural frequency. Such action eliminates synchronization of screen operating speed with the natural frequency of the supporting structure.

Formerly a laborious procedure, the work has been greatly simplified to the point where calculations have been reduced to simple graph form. Too lengthy to be reproduced here, these calculations are readily available. In this method, the only quantities which must be determined in advance are the span dimensions, dimensions of the members supporting the screen, the operating speed of the screen and whether or not loads other than the screen are supported from the same structure.

When supporting beams are directly connected to vertical columns, the natural frequency of the supporting structure should be 1.5 times the operating speed of the screen for spans up to 16 ft. and two times for spans over 16 ft. When supporting beams are not directly connected to vertical columns, the natural frequency of the supporting structure should be two times the operating speed of the screen for spans up to 16 ft. and 2.5 times for spans over 16 ft. For long spans, beams of this rigidity are very expensive, and by careful design it is possible to obtain a design with a natural frequency of at least 1.5 times the operating speed of the screen. Screen supports should be isolated from roof trusses, etc., to prevent transmission of vibration throughout the structure.

*Processing Machinery Department, Allis-Chalmers Manufacturing Co.

Correct Screen Feeding

Proper distribution of the feed to a screen is necessary. It is easier to obtain even distribution of the feed if it arrives at the screen on a line parallel to the longitudinal axis of the screen. Feed chute designing should be carried out with this in mind. An experienced operator will build a feed chute which reverses flow direction just before the feed enters the screen (here reference is made to feed material that does not exceed 2½ in.) Fig. 1. Entrance velocity is thus reduced and consequently the wear on the feed end section of the screening surface is cut down. A stone box immediately ahead of the screen will give the same results.

Entrance velocity is important when handling large volumes of water on fine mesh apertures. Too great a velocity will cause flushing down the screen, reducing maximum use of screening area. Velocity can be reduced by bleeding off part of the water through a stationary sieve in the feed chute (Fig. 2). This is arranged so that the underflow is directed to the collecting hopper below the vibrating screen.

Where spray water is applied to a vibrating screen, the most important point in the installation is locating the sprays so that the width of the screen is entirely covered by a curtain of water (Fig. 3). Sprays must be located so that they strike the material on the deck at the correct angle. Too great an angle will hold up the flow over the deck and result in an excessive bed depth which may render the sprays ineffective. The correct angle is best determined by trial after the screen is in operation.

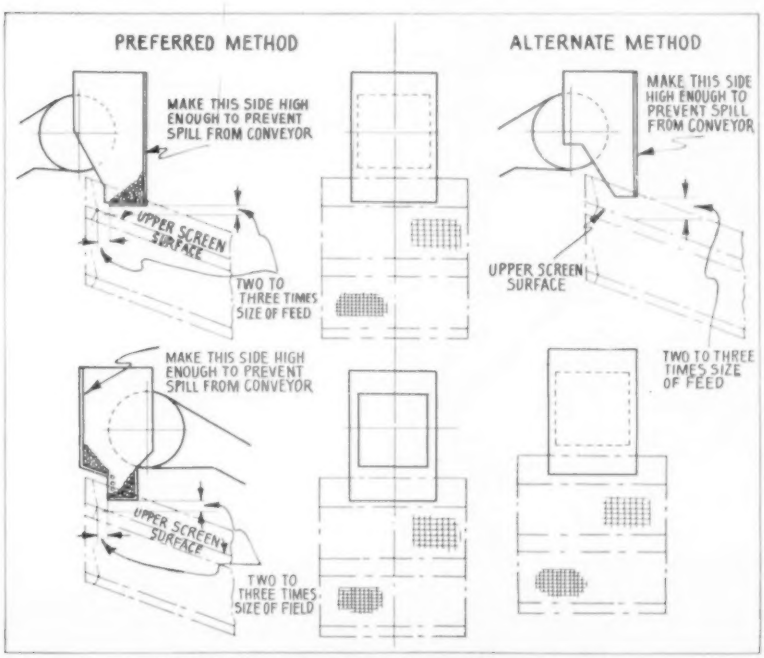

PREFERRED METHOD
ALTERNATE METHOD
MAKE THIS SIDE HIGH ENOUGH TO PREVENT SPILL FROM CONVEYOR
UPPER SCREEN SURFACE
TWO TO THREE TIMES SIZE OF FEED
MAKE THIS SIDE HIGH ENOUGH TO PREVENT SPILL FROM CONVEYOR
UPPER SCREEN SURFACE
TWO TO THREE TIMES SIZE OF FEED
MAKE THIS SIDE HIGH ENOUGH TO PREVENT SPILL FROM CONVEYOR
UPPER SCREEN SURFACE
TWO TO THREE TIMES SIZE OF FIELD

Fig. 1: Feed spout arrangement for circular motion screen

Correct Chute Design

The stationary discharge chutes which carry the sized products from the various decks of the vibrating screen should be easily removable. Worn screen cloth sections then can be replaced in a minimum of time. This is most important on the lower decks of multiple deck screens. In such cases, rigid chutes would force the removal of the top deck screening surface in order to gain access to the lower decks. Similarly, the feed end of the screen should be clear for ease in replacing the screen surfaces on the lower decks. In an alternative method, discharge chute can be hinged so it can be swung away exposing the discharge end of screen (see Fig. 4) making changes

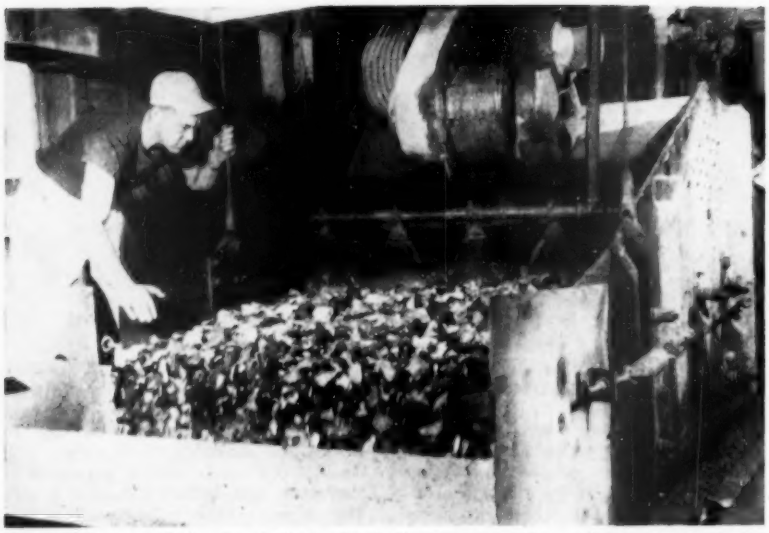


Fig. 3: Discharge end of a 5- x 14-ft. low-head vibrating screen. The mechanism for this screen is mounted above the top deck. Note how the water sprays are spaced across the entire bed of material

of worn screen surfaces on multiple deck screens relatively easy.

Suspension Mounted Screens

On cable-suspended screens, a stabilizer block is furnished for each cable. The blocks prevent whipping, especially when long cables are used. Stabilizer location is determined best by trial. Where the cables do not whip, stabilizers need not be installed, (Fig. 5).

Suspension cable springs must be adjusted so that each pair of springs at a given end of the screen are compressed equally. This avoids diagonal loading which might cause twisting of the screen body and subsequent

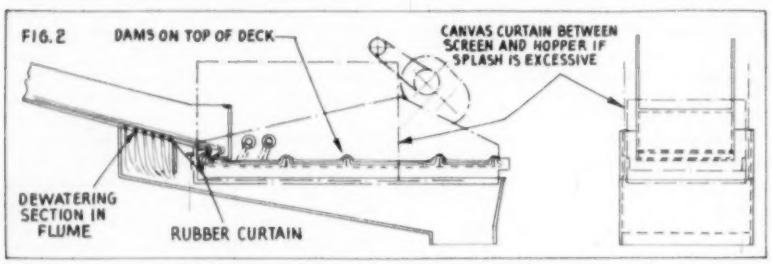


FIG. 2
DAMS ON TOP OF DECK
CANVAS CURTAIN BETWEEN SCREEN AND HOPPER IF SPLASH IS EXCESSIVE
DEWATERING SECTION IN FLUME
RUBBER CURTAIN

Fig. 2: Feeding a screen with large amount of water

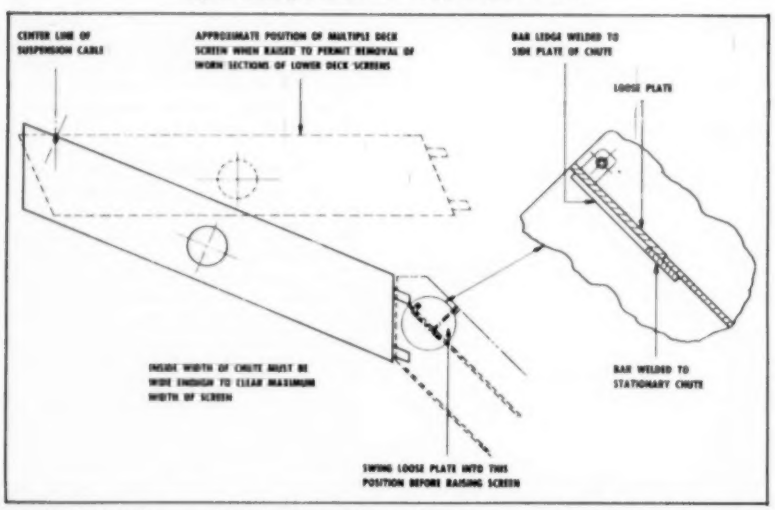

CENTER LINE OF SUSPENSION CABLE
APPROXIMATE POSITION OF MULTIPLE DECK SCREEN WHEN RAISED TO PERMIT REMOVAL OF WORN SECTIONS OF LOWER DECK SCREENS
BAR LEDGE WELDED TO SIDE PLATE OF CHUTE
LOOSE PLATE
INSIDE WIDTH OF CHUTE MUST BE WIDE ENOUGH TO CLEAR MAXIMUM WIDTH OF SCREEN
BAR WELDED TO STATIONARY CHUTE
SWING LOOSE PLATE INTO THIS POSITION BEFORE RAISING SCREEN

Fig. 4: This line diagram of the discharge end of a vibrating screen and its discharge chute show the loose plate chute necessary to permit swinging screens. As the multiple-deck screen is in the upper position, denoted with dotted line, the worn screen sections of the lower decks can be replaced easily

critical speeds or premature bearing failures. Compression in the suspension springs is adjusted by tightening or loosening the nut on the cable fitting, where the fitting projects through the guide washer. In some instances suspension springs will tend to whip. Overcome this by placing a weight on top of the guide washer or tying two springs together with a steel angle (Fig. 6).

Location of Motor

Proper location of motor will help eliminate excessive belt pull when the screen bounces on starting or stopping. For low-head screens with straight line motion at 45 deg. from the horizontal, the motor should be located so that the center line of the drive is approximately 35 deg. from the horizontal.

For Ripl-Flo screens having circular motion, the motor should be located so that the center line of the drive is on a horizontal line through the mechanism or not exceeding 15 deg. above or below the horizontal line. Short cables with springs are provided with each suspended type screen to maintain proper tension in the Texrope belts (Fig. 7).

Friction Check Installation

Friction checks are used to stabilize the screen and snub screen motion at the resonant period during starting and stopping. These friction checks consist of a friction block and pressure spring in a housing supported on a stationary mounting separate from the screen. These friction blocks bear against the four corners of the screen. Sufficient clearance is provided between the friction check and the housing to permit free vibration when the screen is operating at normal speed. At the resonant period, during starting and stopping when the screen tends to bounce, the friction block strikes the housing and thereby snubs the screen motion. When the friction check is installed, the clearance between the friction block and the housing should be checked to be sure that the friction block does not strike the housing when the screen is operating at normal speed. Correct pressure for the friction block is obtained by proper selection of the pressure spring at the factory and no further adjustment is necessary.

Lubrication of Screens

Low-head screen mechanisms, as shipped from factory, are filled with rust-inhibiting oil. This fluid prevents corrosion of gears and bearing during transit and subsequent storage at the customer's plant. Drainage of fluid from the mechanism should not take place until the screen is placed in operation. When preparing for operation, the rust inhibiting oil is drained and the mechanism is filled to the proper level with a recommended lubricating oil.

On present day mechanisms, the oil

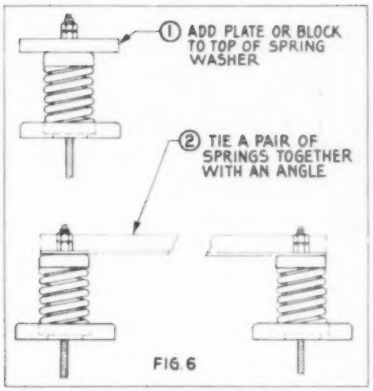


Fig. 6: Methods of eliminating suspension spring wobble

level is checked by removing a pipe plug, found at the side of the mechanism housing near the bottom. When oil flows from this tap hole, the mechanism is filled to the proper level. When operating, the mechanism is splash-lubricated by counter-weights passing through the oil.

The mechanism is equipped with a vent to relieve inside pressure. If this vent becomes plugged or is removed, pressure inside the mechanism may cause oil leakage through the oil seal, may damage the seal and will increase operating temperature of the mechanism. In a new mechanism, the first oil change should be made after approximately 40 hr. operation. Subsequent changes should be made at approximately 300-hr. intervals.

On grease-lubricated mechanisms for Ripl-Flo screens, a small amount of grease should be added to each bearing every 8 hr. of operation. On oil-lubricated mechanisms, the oil level should be checked periodically and oil should be changed after approximately 300 hr. of operation. The oil and grease recommendations of the manufacturer should be followed.

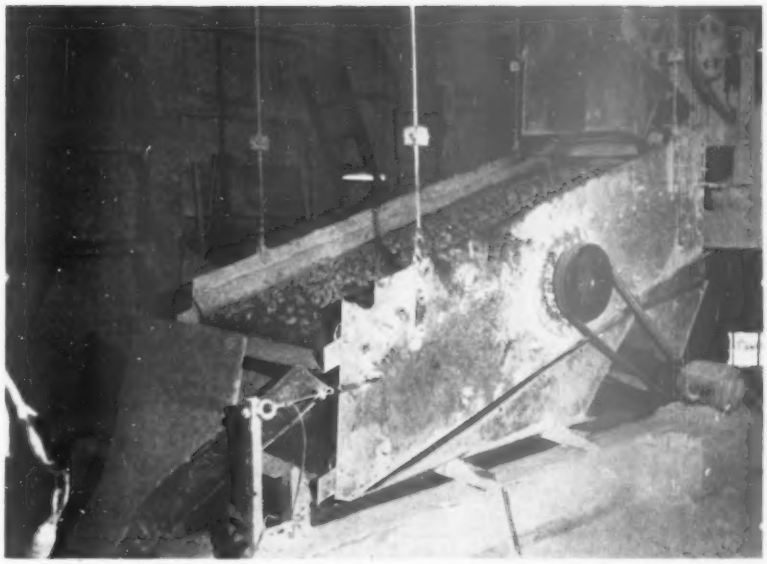


Fig. 5: A 4- x 10-ft. double-deck circular motion screen at limestone screening plant. Note feed and discharge arrangement and stabilizer blocks

Screen Surface Maintenance

Maintenance of screening surfaces consists principally of checking the supports below the surface and keeping the proper tension across the surface. Woven wire cloth screens are supported on a crowned surface type deck and rest on rubber buffer strips. If these buffer strips are worn out or lost, the crown of the deck is destroyed and the cloth will whip and fail by fatigue. Wire cloth is tensioned by clamping bars at the sides of the screen.

No hard and fast rule can be given as to the exact amount of tension to be applied. This can be determined best by trial. Some operators advocate using a torque wrench to insure even tension in all of the clamping bar bolts.

Dimensions of each section of wire cloth should be checked before installation. Each section should be 1 in. narrower than the inside transverse dimension of the screen. The hooked edges of the cloth sections should be parallel to obtain even tension over the entire area. Since stretching will occur, due to the crimp in the wire, newly installed sections of cloth should be checked at frequent intervals. Tension is not a problem in other types of screening surfaces, such as perforated plate, Bixby-Zimmer panels or Wedge-Wire panels, but care should be taken in properly supporting and securely fastening these plates and panels to the screen to avoid whipping.

The anti-friction bearings are the heart of the screen mechanism and

(Continued on page 118)

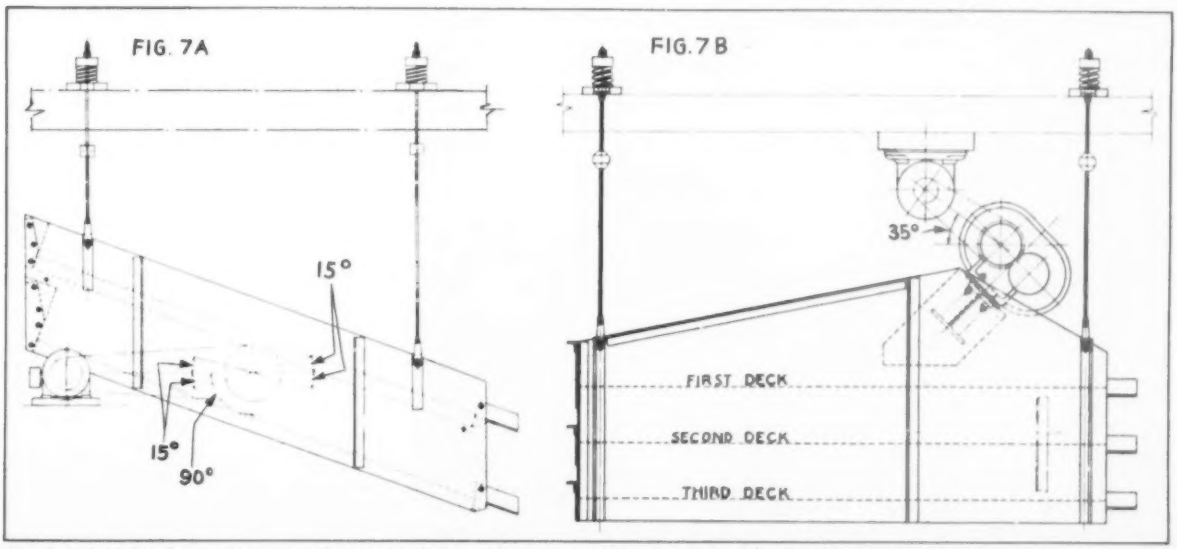


Fig. 7 A, left: Circular motion screen showing angle in mechanism mounting. Fig. 7 B, right: Low-head screen showing angles in mounting

QUALITY CONTROL

Theme of Lime Operating Meeting

Forum panel subjects include quarry and crushing practices, kiln operation, safety, user's requirements, and research

ATTENDANCE and participation in the operating meetings of the Operating Division, National Lime Association, have grown steadily since the first one was held in 1946. There were 76 present at the first meeting and the average attendance was about 82 for the first six meetings. Attendance has increased steadily since, and an all-time record of 167 with 46 ladies included was established at the ninth meeting held October 12-14, 1953, at Birmingham, Ala.

This consistent growth reflects the fact that producers are benefitting through the exchange of ideas about production. Each meeting has shown progress in its planning and in the desire of producers to pass on suggestions to each other, which will reduce costs and improve the quality of lime. Unquestionably, these meetings have become one of the outstanding activities of the National Lime Association.

Birmingham was scheduled for the meeting at the invitation of the member companies in the area, which is one of the largest lime producing areas in the country. In the adjacent vicinity are a number of lime plants, both with vertical and rotary kilns, which provided the opportunity for a full-day field trip. It has always been the practice to schedule locations where there are plant operations available for inspection.

F. J. Collins, vice-president, The Kelley Island Lime and Transport Co., Cleveland, Ohio, is chairman of the Operating Division.

M. A. Rikard, vice-president, Southern Cement Co., Birmingham, was chairman of the program committee which included Alan B. Cheney, president, Cheney Lime and Cement Co., Birmingham, K. L. Hammond, secretary-treasurer, Keystone Lime Works, Inc., Keystone, Ala., and George L. Scott, Jr., manager, Alabaster Lime Co., Alabaster, Ala.

The program committee did an exceptional job in planning the program and a program of entertainment that will long be remembered. An old-fashioned southern barbecue at a delightful outdoor camp and a cocktail reception and dinner dance at The Club atop Mount Vulcan, which is one of the finest in America, constituted the evening entertainment through courtesy of the four host companies, the St. Regis Paper Co. and International Paper Co. There were other unscheduled social activities and a committee of Birmingham ladies had arranged a sightseeing tour and a luncheon at one of the Birmingham Country Clubs.

There was an international flavor to this meeting. Among those from outside the United States were Hermann Lange, president of the German Lime Association; Dr. Hans Holland, N. E. Schwenk, Herrlingen, Germany; Josef Schnuch, Trierer Kalk, Dolomit E. Zement Werke, Wellen, Germany; R. G. Foster, Winnipeg Supply & Fuel Co., Ltd., Winnipeg, Canada; John K. E. Douglas and R. E. Lowther, Northern Lime Co., Ltd., Johannesburg, South Africa; and Geoffrey W. Talbot and Flaxney P. Stowell, Imperial Chemical Industries Ltd., Lime Division, Buxton, England. Messrs. Talbot, Lange and Stowell were participants on the program.

General Manager Robert S. Boynton, N.L.A., left, with Clarence Stielstra, The Dow Chemical Co., Ludington, Mich., program chairman for 1954 meeting

Field Trip

Plants visited by chartered bus on the opening day included the following:

Southern Cement Co.'s North Birmingham plant where hydrated lime is used in the manufacture of mortar.

Keystone Lime Works, Inc., plant at Keystone, Ala., which is a gas-fired vertical kiln plant.

Alabaster Lime Co., Alabaster, Ala., plant which has Azbe gas-fired vertical kilns and which is the only lime plant in the United States where CO_2 gas is drawn and used for the manufacture of dry ice.

Cheney Lime and Cement Co., Landmark, Ala., plant which is a gas-fired vertical kiln operation.

Southern Cement Co.'s new rotary kiln lime plant at Roberta, Ala., where two large rotary kilns are under installation for the manufacture of cement clinker for mortar cement.

Luncheon was served at the Keystone plant and the party went direct to the Ard's Camp "Cirtirest" for the evening barbecue.

Program

The program differed from those of the last few meetings and was planned for a series of panel discussions covering all phases of production. Each subject classification had a panel moderator and each panel member discussed a specific phase of the general subject under consideration. A question and answer period followed.

A unique feature was a panel consisting of technical representatives of large lime consuming companies, who outlined their specifications for lime and gave the reasons why they must require certain specific physical and chemical requirements in lime. This was an extremely interesting session because the consumer panel pointed up some very good reasons why the lime producer must put increasing stress on quality control. More important than that was the discussion period and the report of Prof. J. A. Murray, M. I. T., on research, which brought out some of the limitations which confront producers of lime, because of the nature of available limestones, in their ability to produce a finished product of required characteristics. The session served the purpose of providing the user and the producer with a fuller appreciation of the problems of each.

Stress on quality control crept into

the discussion period in each session, showing that the industry recognizes its obligations and the importance of conducting its plant operations for the best possible end product.

Chairman F. J. Collins, in calling the first session to order, welcomed those present from foreign countries and the representatives of lime consuming companies. He commented on the steady growth and improvement of the operating meetings and how important it has become for producers to share their experiences with each other. This interchange of ideas among producers in the industry is extremely valuable, he emphasized, in meeting the challenge of competition from products other than lime. Drywall construction was mentioned as an example of outside competition which must be met on the competitive grounds of cost and quality.

Mr. Collins pointed to accomplishments of the steel industry, through the pooling of technical and production information, in meeting the challenge of plastics, magnesium and aluminum and in providing consumers better and cheaper steel products as a result. He concluded by expressing his deep appreciation to Program Chairman Rikard and his committee for their efforts in arranging the program, and by thanking the individual companies which served as hosts.

The first forum covered the subject, "Quarrying, Mining and Preparation of Stone for Lime Burning," with J. C. Andrews, The Kelley Island Lime and Transport Co., Cleveland, Ohio, as moderator. Each of five panel members briefly covered a phase of the broad subject, and questions followed.

L. E. Smith, The Kelley Island Lime and Transport Co., discussed stripping, drilling and blasting. On the subject of stripping, he mentioned that it might be well to profit from the experiences in earth-moving for road construction projects in seeking cost data and ideas in the selection of equipment. The use of the dragline or backhoe was suggested in some difficult cases involving uneven rock top surfaces.

Mr. Smith outlined the great progress over the years in drilling and blasting leading up to development of the rotary drill. His experience with the rotary drill has been favorable and had been reported upon in previous operating meetings. Performance as reported earlier is standing up, he said. His company has three rotary drills at the Marblehead, Ohio, operation, and drilling costs are averaging 23 cents per foot. One of the early difficulties has been corrected by selection of the proper drill bit after some experimentation. It was pointed out that variations in the stone are important in determining the type of drill bit to use. Should water content be such that the cuttings have a putty-like consistency, trouble ensues which can be overcome by the addition of more water.

George L. Scott, Jr., Alabaster Lime Co., left, and L. John Minnick, G. & W. H. Corson, Inc., Plymouth Meeting, Penn., discuss instrument readings for shaft kiln at Alabaster plant

Mention was made of a new "jet rig" for drilling which was demonstrated in the Gibsonburg, Ohio, area recently. In this demonstration, a 65-ft. hole was drilled in 35 minutes. Considerable interest was expressed in this machine. It is termed the "Verel," was developed in Texas and is being handled in the East by McCartney Drill Co., Youngstown, Ohio.

The trend with Kelley Island is to the use of greater spacing and shorter burden in the placing of drill holes. Experience with milli-second delay blasting has been excellent and secondary breaking has been reduced to extremely low cost.

Mr. Smith quoted dates and facts from the duPont anniversary book in tracing the significant development in blasting agents from the time that black powder was first used in China in 1627.

Questions brought out that several new drills of the rotary type are under development, and that a new-type detonating fuse and plastic caps are now on the market. In answer to a question as to the amount of drilling required to justify the expense of a rotary drill, Mr. Andrews made the suggestion, as he has done before, that small permanent and portable plants consider contracting for rotary drilling.

E. I. Williams, Riverton, Va., left, discusses a knotty problem with program chairman, M. A. Rikard

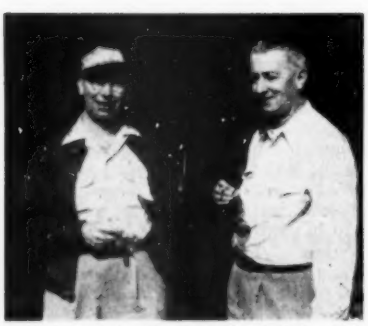
Loading, hauling and crushing were covered by J. G. Wilson, manager of operations of the Cedar Hollow, Penn., plant of Warner Co. Ten years ago, at Cedar Hollow, sledges were used following secondary breaking, and cars were then loaded for delivery of stone to the kilns. The quarry has since been mechanized. Cost for this operation was 25 cents per ton, and would have been 60 cents today after the many wage increases of recent years. By comparison, the cost is in the 12-15 cent range, using a power shovel and including maintenance, supplies, labor, fuel and depreciation calculated on the basis of ten years. In the last five years, there have been great improvements in diesel-powered shovels including torque converters, and in controls and clutches, said Mr. Wilson. Whereas there has been a trend to the use of rubber-tired haulage units, he pointed out that there are circumstances, with long straight quarry faces and long hauls, where locomotives and cars apply.

The primary crusher should be in the quarry, in his opinion, and if it be a jaw crusher should be equipped with a feeder of sufficient length to up-end the slabs. In comparing types of crushers he pointed out that the gyratory has twice the capacity of a jaw crusher of the same size opening. Another advantage is that stone may be dumped into either side, but disadvantages are cost of the crusher and added headroom required. Crushing rolls are good for fragile rock, he said, and double-swing hammermills have high capacity and produce a cubical product. Disadvantages are a relatively high percentage of screenings and increased maintenance.

In his opinion, stone should be pre-

Fred Witmer, Ohio Hydrate and Supply Co., Woodville, Ohio, left, with C. W. Streit, Southern Cement Co., Birmingham, Ala.

D. M. Kerr, Kaiser Aluminum and Chemical Corp., Salinas, Calif., featured a bright cap for the field trip, and W. J. Barrett, New England Lime Co., Adams, Mass., had his conventional cigar



L. N. Carmouche, The Dow Chemical Co., Ludington, Mich., left, chatting with Bob Temple

Two Pennsylvania producers, C. C. Fulmer, Plymouth Meeting, and Caspar E. Arndt, Annville

pared ready for crushing for a cost of 18-20 cents per ton in modern plants. This would include a loading cost of 10 to 15 cents per ton and a transportation cost of 5-7 cents. Primary crushing cost should be 9 to 11 cents and 2 to 4 cents would be required to elevate the stone from the quarry to the screening plant. The total would be 45 to 55 cents per ton as a goal to shoot for, exclusive of taxes and other such added expense. Cost might even be reduced lower where there is ideal terrain and large output.

For efficiency, the problem, as he expressed it, is to take the good equipment available and fit it together in the best way to meet the specific conditions, which amounts to sound engineering from the start in plant building. Mr. Wilson suggested some ideals to seek. First, is the selection of the proper size of shovel and crusher. Next, he suggested that good visibility, good circulation, adequate stairways and sufficient roominess be made available to the plant operators. Care should be taken in the design of chutes and hoppers to prevent hangups. When mistakes are disclosed, corrections should be made right away.

In answer to a question about the use of side-dump vs. end dump trucks, Mr. Wilson said that the end-dump type is preferred where the plant is under-shoveled. Side-dump trucks, on the other hand, are preferred from the stand-point of crusher performance.

D. M. Kerr, Kaiser Aluminum and Chemical Corp., Salinas, Calif., covered the discussion on screening, classification, storage, reclaiming and rescreening. His comments were based largely on his own operations. He discussed the relative merits of types of screens, leaning to the use of horizontal vibrating screens for the smaller sizes and where headroom is a factor.

Washing and scrubbing operations to remove impurities were touched upon generally. Mr. Kerr said that he was just as enthusiastic about the heavy media process as he was a year ago when he reported on this development. At his plant, the process is effective in reducing silica content down to ½ of 1 percent. About 8 percent of the stone treated, which is in the size range of 4½ in. to ¼ in., is discarded in the process. The discussion period developed that Kelley Island has doubled its production of finely ground agricultural limestone through the use of heated screens.

Mining operations of Mississippi Lime Co. at Ste. Genevieve, Mo., were described by Herman Ballenger, superintendent of the mine. The company has two mines at this location with a combined capacity of 500 t.p.h. One is for the production of plus 4-in. stone for vertical kilns and the minus 4-in. product is either sold or used for rotary kilns. The second mine is exclusively to supply rotary kiln feed, of stone crushed to minus 2¼-in. size.

The deposit is of uniform, flat-lying high calcium limestone with a 90-ft. thickness resting on and covered by impure limestone. Headings are 60 x 22 ft. high, leaving 25- x 60-ft. pillars. Recovery is 83 percent of the stone. Headings are drilled by jumbo-mounted multiple percussion drills. Four drills are used on a jumbo, drilling 15-ft. holes. Loading is 550 lb. of explosive per heading shot, to bring down 1100-1200 tons of limestone, using milli-second delay blasting.

Loading is by 1½- and 1¾-cu. yd. diesel and electric shovels dumping into side-dump diesel trucks of 15 tons capacity. The primary crusher is underground and the stone is elevated out of the mine by skip hoist. Practice is to drill and blast so as to store a considerable tonnage on the floor of the mine.

L. N. Grindell, United States Lime Products Corp., Los Angeles, Calif., covered core drilling, geology and quality problems in general. Mr. Grindell emphasized the extent to which the geology of any deposit determines the quality of product and methods of extraction. In Nevada, where his company has plant operations, the value of core drilling has proved extremely important. He pointed out that more geologic problems including volcanic action, faulting and folding are presented in Nevada than elsewhere, resulting in tilting, faulting, replacement and great variations as a result, in quality and impurities.

Core drilling is used to advantage to determine the extent of faulting and offsets in the limestone formation. Experience is that core drilling requires close spacing for accuracy. If the spacing be as much as 50 ft., there is possibility of missing dolomite contained within the high calcium limestone. Core drilling is used to determine the extent of deposits and, he said, is of value in mines for locating mud seams and water courses. The practice is gaining in importance with the growing need for locating high quality chemical-grade stone.

In reply to a question, Mr. Grindell said that it is practicable to catch the cuttings from a rotary drill and analyze them for quality. Winter problems came in for considerable discussion. Fred Witmer, Jr., Woodville, Ohio, described the use of strip heaters for hopper gates. He also commented on washing during cold weather. The fact that the average ground water temperature in his area is 55 deg. F., permits his operation to continue down to temperatures of 15 deg. F., which means that there are only about ten days when washing cannot continue. To do this requires fast handling, he emphasized, and that the bins be kept open so material is on the move.

Calcination

Philip L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Penn., was panel moderator for a forum on "Lime Burning of Dolomitic and High Calcium Stone in Rotary and Vertical Kilns."

Hermann Lange, Hohenlimburger Kalkwerke, Germany, discussed conditions and technical developments in Germany. Mr. Lange told of putting in a six weeks' training period working in American plants 27 years ago, in order to learn of our practices.

Solid fuel is the only type available in Germany and it is very expensive and labor is cheap by American standards. As a result shaft kilns including some of the mixed feed type are used.

Mr. Lange described a relatively new charging device which was developed to improve size distribution in the kiln. The open bottom charging bucket is slightly less in area than the kiln. Limestone and coke are charged into the bucket. Smaller sizes are placed toward the periphery of the bucket and the balance of sizes distributed through the bucket. Reason for development of the bucket is that producers are burning a large range of stone sizes in one kiln, which are separated by screens for the purpose of charging.

The bucket is elevated by push-button control and is designed for quick discharge, to deliver the charge into the kiln as arranged in the bucket. The smaller sizes are at the periphery where temperatures are lowest; the effect being to obtain a uniform degree of burning whether the stone be small or large. Six such installations are under construction in Germany. Average production is 140 short tons of lime per kiln. Mr. Lange said that there is likely to be a shift to producer gas for firing lime kilns in Germany.

Annual demand for lime in Western Germany is six million tons annually, for an area with 48 million people. Thirty percent of the total is building lime and 55 percent is for industrial use. Steel production is 18 million tons and 1.2 million tons of metallurgical lime are required annually.

Part of group on inspection trip of Alabaster Lime Co. plant

K. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala., points out features of his quarry. Clarence La Liberte, Cutler-Magner Co., Duluth, Minn., is on right. On left, with hat, is Donald G. Hamme, National Gypsum Co., Buffalo, N.Y.

Victor J. Azbe, Azbe Corp., St. Louis, Mo., confined his discussion to the subject of temperature control of the high capacity kiln, emphasizing at the outset that temperature control is an absolute essential to the production of high quality lime. From this point of view, the industry has not been doing a good job in his opinion.

Mr. Azbe summarized progress from the time he presented his first paper before the N.L.A. 30 years ago. Over the years, the sizes of vertical kilns have become smaller and the output greater. Thirty years ago it was not uncommon for a 24-ft. diameter kiln to produce only 70 tons of lime per day which was of poor quality by present standards. By contrast, he said that a properly designed 10-ft. kiln will now produce 70 tons of lime. In addition, temperatures are less and the quality of the lime is much improved. The lime is softer burned, has less core, is low in sulfur, has little breakage, available CaO is higher and runs are longer. Applica-

Two views of the gang eating box luncheon at Keystone Lime Works plant

Bob Boynton, general manager of N.L.A., left, poses with George C. Walter, Southern Cement Co.

tion of the same principles could result in production of 100 tons of lime from dolomite according to Mr. Azbe.

Whereas the early kilns had a production of 600 lb. of lime per sq. ft. of effective cross area, the yield has been progressively increased up to 3500 lb. per sq. ft. in the modern kiln. With properly sized stone and correct heat application and distribution, Mr. Azbe anticipates that a production of 4000 lb. per sq. ft. can be attained when burning a stone of 8- to 9-in. top size.

Commenting on technical developments outside the United States, he said that lime trimming is often not practiced. Instead, he mentioned one of his clients who draws automatically at 10-minute intervals. The product is softly burned, uniform and has no crust.

Mr. Azbe spoke of kilns producing high calcium lime at 4 million B.t.u. per ton and dolomitic lime at 3.5 million B.t.u. With proper temperature control, he said the kilns could be operated for five years without repair and that many of the corrective practices now in use having to do with quality would be unnecessary.

Mr. Azbe said that it was his goal to achieve 100 t.p.d. from vertical kilns and to produce lime from rotary kilns with a fuel consumption not to exceed 5 million B.t.u. per ton.

Turning to a discussion of stone feed, Mr. Azbe said that it was unreasonable to crush limestone through a jaw crusher and then feed the slabs into a kiln. These slabs, he said, must be recrushed. If there be large, medium and small sizes of stone, they should be burned separately. As to sizing, he said that it is only done with reference to size whereas it should be on the basis of relative calcining rates. One piece of stone might require twice the calcining rate of another fed the kiln. Mr. Azbe recommends the use of slotted screen openings.

He said that the Azbe kiln at Menke Stone and Lime Co., Quincy, Ill., is now up to a production of 70 tons with a fuel consumption of 4.8 million B.t.u. per ton and a draft of 2 in., and he cited other installations that are on the upgrade.

In the modern kilns, air temperatures through the coolers are now up to 1600-2000 deg. F. Mr. Azbe's newest plan is to use double-level firing with an interval of 4 to 5 ft. between the two levels. About one-third the gas would be burned at the lower level, which would be a finishing zone of lower temperature. The upper level would have an excess gas, resulting in incomplete combustion and a flowing flame of high radiant heat. High velocity jets of air above would terminate combustion and prevent channeling. Mr. Azbe concluded with comments on wall effect studies now underway to determine rate of gas flow. These studies indicate very great variations.

Casper Arndt, H. E. Millard Lime and Stone Co., Annville, Penn., described two methods used to start up the company's large rotary kilns which are in the 300-ft. size range. Regardless of the method used, after maintenance work is completed during a shut-down, the refractory lining is swept with high temperature mortar. The kilns are insulated to within 70 to 90 ft. of the discharge ends which makes it desirable to seal the linings with a soupy mortar.

In one system of firing up, from six to eight tons of railroad ties are placed in the burning zone for a distance of 30 to 40 ft. A half truckload of kindling is placed and soaked with kerosene. The pile is lit by match and the wood is permitted to burn for three or four hours after which the direct-firing coal mill, which has first been tested, is started. The kilns have 4-speed drives and are started at the top speed in order to bring the bed down as quickly as possible in order to protect the brick.

Practice is to run the coal mill periodically until the bed of material has come down into the burning zone and it is run at a slow rate at first in order to save the lining. From 2½ to 3 hr. are required to bring the stone down for steady operation. Some of the first lime is dumped and for a period of 5 to 7 hr. a second grade product is produced. Total time required to come into production of high grade lime is 15 to 16 hr.

John K. E. Douglas, Northern Lime Co., Ltd., Johannesburg, South Africa, left, with Victor J. Azbe, St. Louis, Mo.

In the alternate system, the stone is first carried down close to the burning zone, the starting wood is placed and lighted, and then the coal mill is started and operations are continued. This method requires a total time of 18-20 hr. to come into production of high quality lime. Results are better from the standpoint of lining protection when the second method is used, but choice of method is determined by the men according to conditions in the plant.

A. L. Scott, Alabaster Lime Co., described performance at his plant, covering two Azbe vertical kilns fired by natural gas with induced draft, and natural draft kilns fired by coal and wood. One of the Azbe kilns was built new and the second had been converted. The Azbe kiln output is one ton of lime per sq. ft. of cross-sectional area and the fuel requirement is 5½ million B.t.u. per ton. Re-circulation of gas is not used so, he said, the kilns are not up to present standards.

These kilns are run at 3-in. draft, which is the maximum draft fan capacity. Lime is drawn at 2-hr. intervals. The kilns have side burners. In commenting on the problems of core and overburning, Mr. Scott put stress on the importance of having proper stone sizing.

Quality Control

Product and quality control was the subject of a panel discussion led by moderator L. N. Carmouche, The Dow Chemical Co., Ludington, Mich. In his opening remarks, Mr. Carmouche stressed the growing importance of quality, particularly now that competition for sales is increasing, and the industry is entering a period when the customer tends to establish more rigid requirements.

Topics considered in this forum included sampling and testing, instrumentation's part in plant control, the application of laboratory data, analysis of customer complaints in their relation to production, and organization for control.

D. G. Hamme, National Gypsum Co., Buffalo, N.Y., covered the phase of sampling and testing. In his opening remarks he emphasized that a good sample of anything is difficult to obtain, and that care must therefore be taken in getting samples because test data depend upon representative samples. He then described methods in use by his company.

Incoming coal is sampled regularly as a guide to the determination of future sources of supply. Limestone in both mines and quarries is sampled according to a standard procedure. Chip rock samples are taken at 5-ft. intervals in mine headings and checked for factors having bearing on quality. In quarries, samples are taken

at 5-ft. intervals normal to the vein and at 40-ft. intervals in the direction of the vein. Core drilling is important to determining the extent of reserves and is used also to locate mud pockets and lens impurities. Samples are taken after each primary blast, sized and tested.

Lump materials are inspected at regular intervals as they come from the kilns. This is done hourly for the rotary kilns as a check on over-and-under-burning. Three samples per kiln day are used for test. Shaft kiln product is inspected for core at each draw.

Pebble lime is sampled as each car is loaded. The sample is taken by the loader completely across the spout, yielding a 75-lb. sample for each 50-60 tons of lime. Quicklime is crushed and tested.

Samples of bagged material are taken by passes across the filling spout and are taken for every 2 or 3 tons of lime. Pulverized or ground lime samples of 25 lb. are taken from the loading spout. Lime samples are retained for 90 days and stone samples for six months.

L. J. Minnick, G. & W. H. Corson, Inc., Plymouth Meeting, Penn., discussed process and quality controls with emphasis on instrumentation. He detailed some of the instruments used and said that the lime industry is rapidly becoming instrument conscious. However, he said that methods of control continue crude in many plants, which still depend upon the "feel" of the product as a measure of plasticity, hammers to determine core and the eye to guide the kiln burner.

The industry still must send samples to the laboratory for analysis to guide the plant insofar as operating for quality is concerned, he said, and one of the important needs is a reliable measure of plasticity of hydrate.

Mr. Carmouche listed the many instruments in use in his operations. He said that one of the principal advantages of kiln instrumentation is that use of instruments greatly speeds up the time required to educate the operators. With proper instruments, a burner can master his job in 12 months whereas it might take 20 years otherwise to gain the knowledge and experience to produce a lime of adequate quality with consistency. Mr. Carmouche considers the use of a suitable oxygen recorder to be very important.

Considerable discussion developed as to means of simplified tests for quality that would be of value to those concerned with sales. One of the difficulties brought out was that there are different procedures of testing and interpretation between producers of lime and their customers, which requires education of the customer as to his wants and methods of measurement of what he is getting. It also amounts to development of testing methods that really evaluate limes.

From Missouri, left to right: C. E. Baxter and A. K. Frolich, Ash Grove Lime and Portland Cement Co., and Russell W. Hunt, Southwest Lime Co.

Panel member F. P. Stowell, Imperial Chemical Industries, Ltd., England, brought up the subject of technical service. In his company, a technical service department functions to educate sales representatives and in the standardization of sampling and testing procedures between customers and the producer.

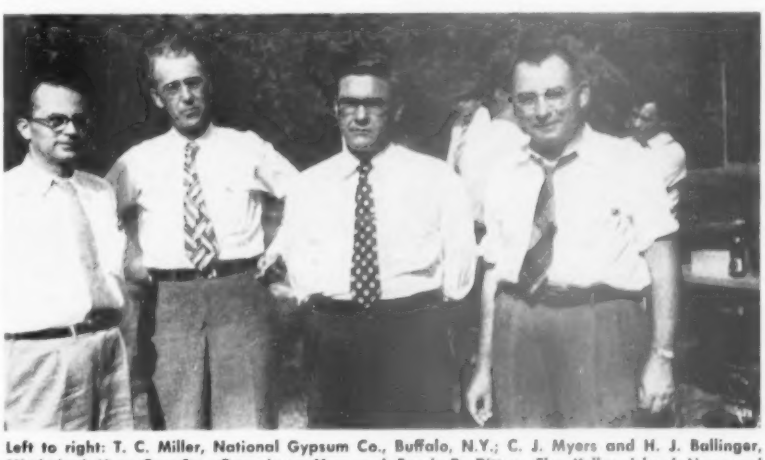
W. J. Barrett, New England Lime Co., Adams, Mass., in his discussion of laboratory control, enumerated various laboratory testing procedures and stressed that all testing must be done with recognition of the fact that the customer calls the shots. Technical service, he said, is more important before and not after complaints about quality are received. Laboratory control data represent past history, as he expressed it, so the real need is for quick procedures in order to detect material that is going off-grade. All the usual testing done for purity must be correlated with customer tests. Close contact between the operating department and laboratory control is needed, he said, in order to anticipate variables.

This subject of quality control proved of great interest and much discussion developed. It was the opinion that certain classes of customers presented no particular problems but that there are many with special and diverse requirements that present a serious problem. One difficulty, as a producer expressed it, is that 90 percent of complaints are attributable to sampling methods even though the product be right. The next complicating factor is method of analysis. Personal contact in the handling of complaints was advocated in order to build up customer confidence.

Mr. Carmouche said that packaging and shipping are tied to quality of product as essentials in building good customer relations. His company (Dow) analyses complaints at year-end and uses them as a guide to strengthening operations. This activity is under a qualified man who has no strings attached and who is only responsible directly to top management. His activities are independent of production.

Safety

Lea P. Warner, Jr., Warner Co., Philadelphia, Penn., was moderator for a 4-man panel discussion on safety. By way of introduction, Mr. Warner stressed the great need for more interest in safety on the part of top management.



Left to right: T. C. Miller, National Gypsum Co., Buffalo, N.Y.; C. J. Myers and H. J. Ballinger, Mississippi Lime Co., Ste. Genevieve, Mo.; and Frank R. Dittoe, The Kelley Island Lime and Transport Co., Cleveland, Ohio

John Minnick, Plymouth Meeting, Penn., left, and Kent Jander, N.L.A., seemed apprehensive about something when this shot was taken

Kent Jander, National Lime Association, presented a factual record of the industry's performance in safety. The first N.L.A. safety contest was held in 1935 with 28 competing plants. With slightly more than 2 million man-hours worked, the frequency rate was 28.6 and the severity rate was 3.3.

The number of participants has increased over the years and, in 1952, there were 52 competing plants. With more than 12 million man-hours worked, the frequency rate was 15 and the severity rate 1.2 for competing plants, which is not considered too good a record.

In 1952, there were 183 reportable accidents resulting in more than 15,000 days lost from work. One fatality accounted for 6000 days lost. As to types of accidents, lime burns led the list and were responsible for 20 percent and 400 days of disability. Material handling other than rock accounted for 16 percent; falls, 12 percent; haulage and machinery, 9 percent each. In comparing with other industries, Mr. Jander cited the 4.6 frequency rate for the portland cement industry and the 17.8 rate for the quarry industry which is near the bottom of the list.

L. N. Carmouche was critical of the record and said that the industry must readjust its thinking and realize the significance of the statistics. He stressed that the industry has a moral responsibility to its men, above all else, and he pointed to economic advantages of safe operation as well.

In the chemical industry, he pointed out that companies with less than 100 employes have a frequency rate four times as great as the larger concerns. Such small companies represent 90 percent of all the companies. They have only 25 percent of the total employes and are responsible for 40 percent of the injuries. This would indicate that smaller companies have much of the responsibility for improving the record.

In The Dow Chemical Co., which had a frequency rate of 2 in 1952, responsibility for safety rests on the line supervisors as well as the safety department. Safety is given equal importance to quality and manufacturing.

Mr. Carmouche used a hypothetical case to bring out the cost side of accidents. He assumed that a million dollar project was to be built, of which labor cost would be about one-half. At $2.50 per hour for construction labor there would be 200,000 man-hours worked. With a frequency rate of 45, the direct cost would be $6750 for the nine accidents, covering medical and compensation costs and using average figures. Indirect costs are four times the direct costs, according to National Safety Council records, which means that total costs for the hypothetical case would be $33,750. This, said Mr. Carmouche, could represent the profits on $6 million worth of sales.

Wallace Wing, Marblehead Lime Co., Chicago, Ill., commented briefly in support of more emphasis on safety. Mr. Warner emphasized, as he has done at previous meetings, that there is a threat of outside intervention unless the record be improved beyond criticism.

Along this line of thinking, G. W. Talbot, Imperial Chemical Industries, Ltd., told of the experiences with compulsory regulation in England. England's Factory Act was passed many years ago, establishing inspections and regulations because of bad factory conditions and negligence on the part of industry. A great many inspectors became active with the result that much of industry's time has been tied up, and there is a question as to the effectiveness of the program. It is management only that can get the job done, emphasized Mr. Talbot.

The Lime Division of Mr. Talbot's company started a safety program in 1948. A great deal of hand labor was used and the accident rate was 120 at the time. The figure has been reduced to 9.2. Equipment is the same and the great improvement is attributable to educational effort. Factors involved are discipline and the placing of direct responsibility for safety on the supervisors.

Mr. Talbot advised that steps to reduce accidents would prove far cheaper and more effective than having regulations imposed that would not get the job done anyhow. As an example of regulations, he said that the law in England covering hand rails specifies that they be 3 ft. 6 in. high, have a middle rail and a 9-in. toe board. Electrical regulations are very rigid.

Mr. Warner concluded this discussion with a showing of slides, pointing out how his company is guarding against specific hazards.

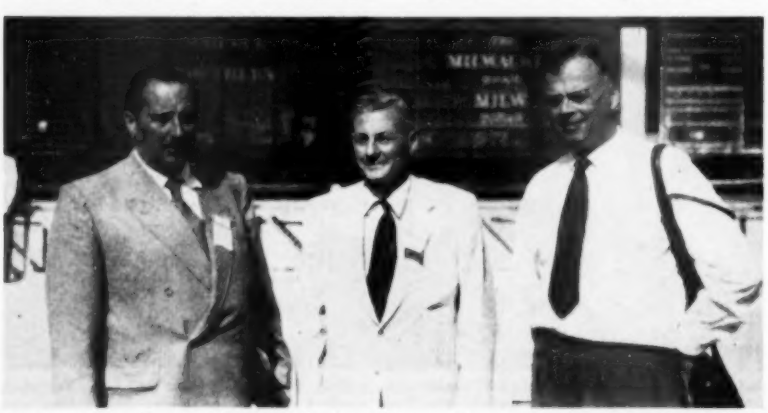
Users' Requirements

C. C. Loomis, New England Lime Co., Adams, Mass., was moderator for the panel of lime consumers. In his opening remarks, Mr. Loomis commented on the geologic processes involved in the formation of limestones and how these processes have resulted in differing physical and chemical properties which set up difficult challenges to the producer, and limitations that must be recognized by consumers who set up requirements. He commented on the growing group of customers who want a lot of differing physical and chemical properties, requiring an increasingly greater number of specifications.

H. A. Caldwell, chief metallurgist, Tennessee Coal and Iron Div., U.S. Steel Corp., discussed requirements in lime for the ferrous metals industry. The main uses of lime materials are for flux, the neutralization of waste pickle liquor and for coating wire rods. There are other minor uses.

In 1951, the iron and steel industries required 36 million tons of limestone for flux, the requirements being 812 lb. per ton of product. Blast furnace production is a reducing operation and the refinement of pig iron into steel is an oxidizing process in open-hearth furnaces.

For flux, high purity is required in the liming material with a minimum of acidic components, principal-



Contingent from Germany. Left to right: Josef Schnuch, Hermann Lange and Dr. Hans Holland

ly silica. He pointed out that otherwise impurities in the liming material must also be fluxed, resulting in increased fuel requirement and excessive slag formation. Sulfur content must be very low, .07 percent, for open-hearth furnaces. Should sulfur content be as high as 3 percent, it would be ineffective in removing sulfur. Sizes of stone required for blast furnace flux are 2 to 4 in. and 4 to 8 in. for open-hearth furnaces.

For neutralizing waste pickle liquor, the average requirement is 0.6 ton of lime per ton of sulphuric acid treated. The use of lime for coating wire rods is to prevent ingots from sticking.

In answer to a question, Mr. Caldwell said that the original charge in an open-hearth furnace is raw limestone. Lime addition is made to increase the basicity of the slag. Burned lime is preferred in the duplex open-hearth process.

T. S. Hostetter, Monsanto Chemical Co., Anniston, Ala., detailed the requirements for lime used in the production of calcium carbide for the manufacture of acetylene. Mr. Hostetter complimented lime producers for the quality of product being shipped. The minimum specification is a requirement of 95 percent CaO which is being surpassed. Producers have worked closely with the consumer, in this case, and the consumer is aiming at a minimum requirement of 97 percent CaO. This will require selective excavation of limestone, he said.

Other requirements for lime used in this process are a maximum of 1 percent MgO, 1-1¼ percent insoluble and 1 percent or less ignition loss. The standards are set up for optimum carbide furnace operating time. Sizing is also important, the requirement being ¾ to ⅛ in. Fines are undesirable because the discharge of gases is adversely affected and dusting would result.

One of the reasons for such a high percentage requirement of CaO is that lime represents 25 percent of the total raw material cost and the high freight rates are a considerable factor.

A hard-burned reactive lime is preferred, that is porous to facilitate the reaction with coke.

H. M. Owen, materials control director, Gulf States Paper Corp., Tuscaloosa, Ala., covered the requirements for lime used by the paper industry. Speaking generally about quality control, Mr. Owen said that nothing could be controlled without controlling the personnel involved. The first requirement is that limits be set up.

There is no common denominator for quality control of lime for the paper industry, he said, because of the diverse uses. High MgO is required for cooking solutions, and requirements for bleaching, waste treatment and other uses are all different. Reason for some paper industries going into the production of lime have been the unavailability of railroad cars and recovery problems. Requirements may vary from as low as 25 lb. of lime per ton of product up to 500 lb. Uniformity of size is important because rejects are hard on equipment. Unburned lime causes jam-ups in the rake classifiers and wastage of liquor. Fast slaking lime is desired in causticizing green liquor. Precipitation of lignin with lime is a coming application, said Mr. Owen.

Left to right: E. H. Siebrass, Menke Stone and Lime Co., Quincy, Ill., R. G. Foster, Winnipeg Supply & Fuel Co., Ltd., Winnipeg, Canada; and R. E. Lowther, Northern Lime Co., Ltd., Johannesburg, S. Africa

He said that it would be mutually helpful for producers to learn more about applications of their products in paper manufacture. He believes the lime industry should undertake more technical service.

Prof. J. A. Murray, Massachusetts Institute of Technology, commented on building lime, in the absence of Hayden Brooks, Blue Diamond Co., Birmingham, who was scheduled to cover the subject. Prof. Murray stressed the importance of that outlet for lime, mentioning that the market is as much as for metallurgical use, twice as much as the tonnage used by paper mills, three times the requirement for water purification and for the carbide industry.

The fact that the building industry market is made up of a great many small users makes it difficult for the lime industry to do an effective job of marketing, said Prof. Murray.

He commented on autoclave testing as a measure of performance of masonry which started with finishing lime as a means to overcome the problem of unhydrated magnesia. The practice has followed for masons hydrated lime. Prof. Murray said that whereas high calcium lime producers believe they are in the clear, he suspects that many such producers cannot meet the one percent limitation on autoclave expansion.

The trend continues to more use of hydrated lime in the building industry as compared to quicklime, except for putty plants, and is also in the direction of more use of masonry cements. It is difficult to compete with masonry cement, he said, because the cement industry has dealers and is thus at an advantage in reaching the many small users. In answer to a question about the use of air-entraining agents to replace lime and some cement, in prepared masonry cements, Prof. Murray said that air-entraining agents would improve workability but will not affect volume change.

Research

Prof. Murray reported on the conduct of the fundamental research program underway at M.I.T. on calcination, and some of the findings to date. Results thusfar have borne out that the industry has much to learn about lime and burning. Prof. Murray has prepared a lengthy report covering the past year's work which will be made available to the membership and from which he drew to bring out significant findings.

The program was started with the objective, to determine why different limestones yield such different results when burned under the same conditions.

At the outset of the study, high calcium stone samples were used in order to eliminate the variable of

(Continued on page 116)

Bob Temple, Los Angeles, left, with Operating Division Chairman F. J. Collins

Recovering High Value By-Products

By WALTER B. LENHART

General view of screening, crushing, and bin facilities. The "dog-house" at upper right is the experimental section for recovery of black sand that contains ilmanite, zircon, magnetite, monazite and gold

Stewart & Nuss, Inc., Fresno, Calif., operates both sand and gravel and ready-mixed concrete plants

STEWART & NUSS, INC., Fresno, Calif., operate two sand and gravel plants, a black top plant, and conduct a thriving ready-mixed concrete business. Their batching plant in the industrial section of downtown Fresno is one of the neatest and most modern in the "Valley" district. Locally, the "Valley" means the San Joaquin drainage area which includes San Joaquin county, the largest agricultural producer (in dollars amount) in the nation. It helps support such modern cities as Sacramento, Stockton, Modesto, Merced, Tulare, and Fresno, the largest city of the group.

Sand and gravel operations of the company include: the older plant, No. 1, north of the city about 8 miles and adjacent to U.S. Highway No. 99 where it crosses the San Joaquin river; and plant No. 2, about 4 miles up-stream. About a year and one-half ago plant No. 2 underwent a major remodeling. It is a relatively small operation equipment-wise, but has several points of general interest. Gravel and sand, at the time of inspection, was being dug from under water with an 80-D Northwest dragline using a 3-cu. yd. Hendrick bucket. The work was in progress on the north bank of the San Joaquin river with the plant on the south bank. An "expendable" bridge is used for the Mack haulage trucks. A few miles up-stream from the plant is Friant dam, a Bureau of Reclamation job and a part of the Central Valley Project. When the dam gets too full of water, or irrigation needs below the dam require it, the engineers notify the gravel operators below and then open their sluice gates. A minor flood results. To cope with this periodic situation, the operators use a series of large diameter corrugated pipe, plus a dirt fill which becomes expendable. The pipe is easily recovered. As the company has other large gravel holdings well back from the river, a permanent bridge was under construction.

Coarser gravels are hauled to plant No. 1 for crushing

Plant Operation

For haulage the company has two 14-cu. yd. Mack rear-dump trucks. As the gravel is loaded and transported, entrained water in the load drains out through ports at the sides of the truck to splatter onto the rear tires. This serves a double purpose; the tires are kept clean, and road dusting is eliminated. The perforated Hendricks bucket used on the dragline also helps the drainage problem. The haul to the plant is about 800 yd. The pit run is roughly 50 percent sand and 50 percent gravel.

Tailings or rejects from the washing plant are impounded behind dirt barriers that flank the south bank of the river near the plant, and the top of this fill is used for a haulage road for primary material when convenient. This pond also is expendable.

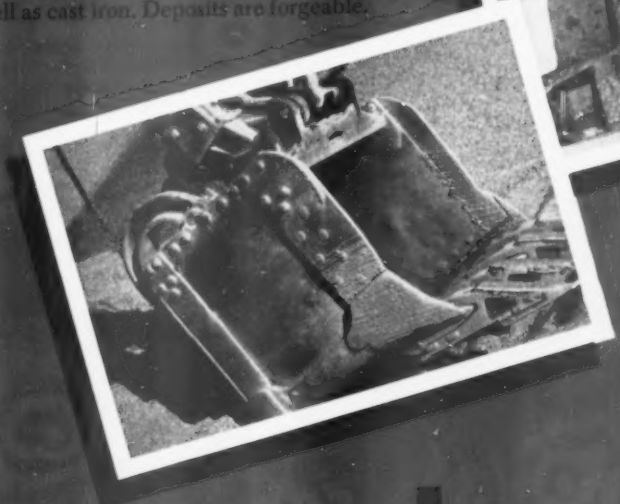
No crushing is done at plant No. 2 and all materials in the plus 2½-in. range are truck-hauled to plant No. 1 for crushing. Later crushing equipment may be installed at this plant.

(Continued on page 96)

For Low-Cost, High Impact Strength

STOODY 1027

The manual hard-facing rod that cuts wear on EARTH-MOVING, ROAD-BUILDING AND SIMILAR HEAVY EQUIPMENT!



If you want low-cost wear protection, STOODY 1027 is for you! Here's an all-position AC-DC electrode that lays down a smooth, uniform deposit or can be applied in multiple passes for higher build-ups. Requires no slag chipping between passes. Runs free from slag interference and bonds readily to plain carbon, alloy and manganese steels as well as cast iron. Deposits are forgeable.

TYPICAL APPLICATIONS

STOODY 1027 is ideal for manually hard-surfacing large bulky parts too heavy to position for over-head welding. Typical uses: tractor rollers, bucket sides, drive sprockets, top carrier rolls, idlers, tumblers, track pads, clutches, clevises, sheaves, grousers, gear teeth, etc.

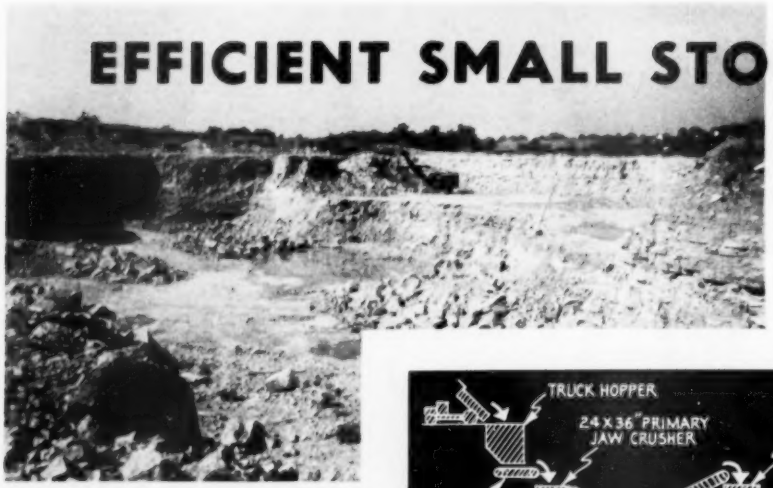
Ask your dealer for details (see the yellow pages of your phone book) or write direct.

STOODY COMPANY

11929 East Slauson Avenue, Whittier, California

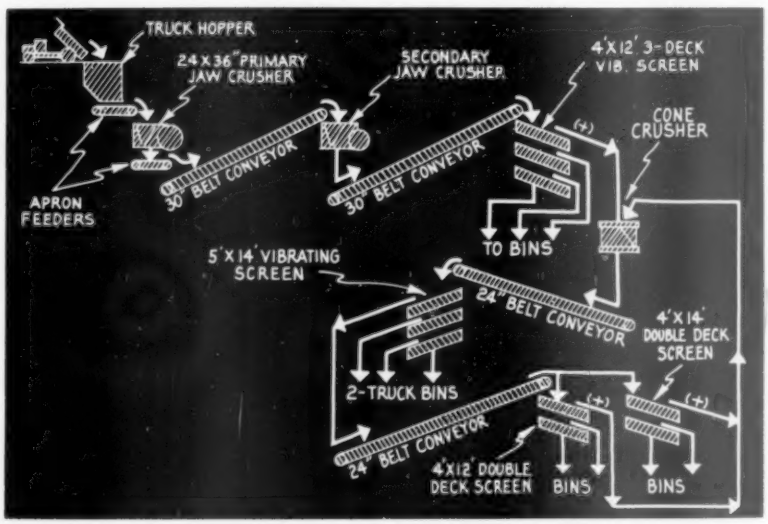
EFFICIENT SMALL STONE PLANT

Falls City Stone Co., Fern Creek, Ky., has compact plant producing both aggregates and agstone



Above: Quarry operations on two benches. In the background is a 2-cu. yd. shovel to load stone

Below: Flowsheet of stone crushing and screening operations



LOCATED AT FERN CREEK, about eight miles southeast of Louisville, is the plant and quarry of Falls City Stone Co., formerly known as the Derby Stone Co. Operations started in July, 1952, but mechanical difficulties prevented full production. Later these difficulties were overcome and the operation is now proceeding smoothly. The plant has a capacity of approximately 200 t.p.h., depending on the stone sizes being made; larger sizes than normal will raise this figure. About 15,000 tons per year of agstone are sold.

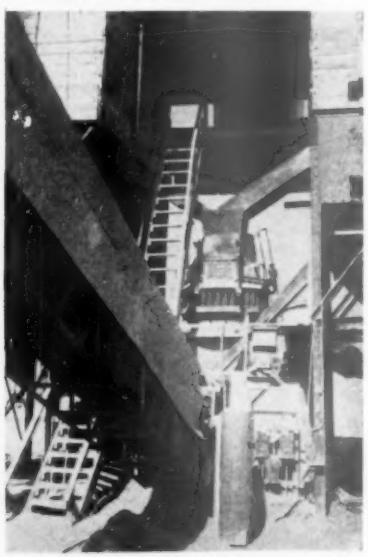
Although the site of the quarry is not new, in reopening the quarry the Falls City Stone Co. ran into the usual legal difficulties encountered when starting a new operation. The rock, a hard dolomitic stone, is quarried from two benches. Rock in the lower bench is wet; the upper bench is dry.

Primary drilling is handled by two Cleveland wagon drills with air from two Ingersoll-Rand 315 compressors. Loading is done with a 2-cu. yd. Northwest 78-D shovel. Four rear-dump Euclids do the hauling to the crusher with an up-hill haul out of the pit for a total distance of about 1200 ft.

The primary crusher is a 24- x 36-in. Lippman jaw crusher with a 16-B Telsmith secondary unit. A 4-ft. Symons cone crusher does the final reduction work.

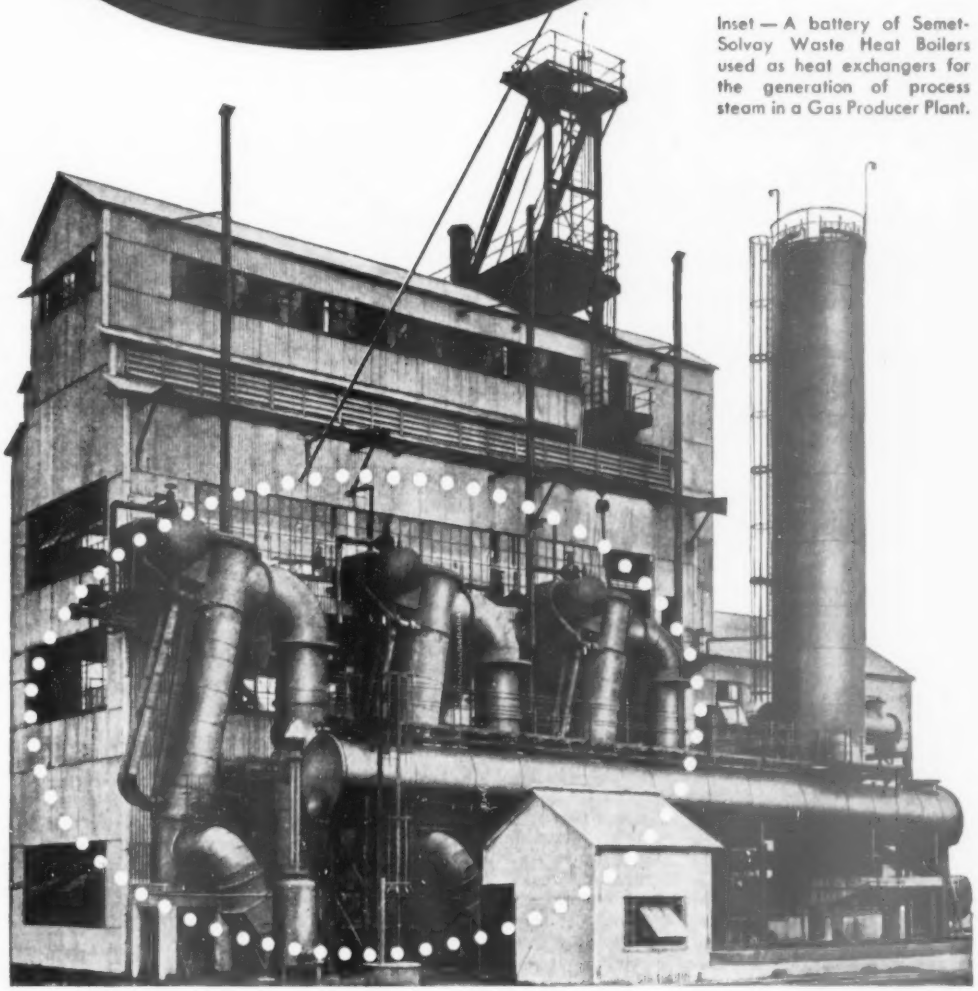
For screening there are two Lippman screens, one Seco and one Simplicity. All operate dry, and 10 sizes of stone are stocked. About 60 to 70

Screens above and at each side of the cone crusher deliver oversize to this crusher



Standard cone crusher for final crushing

Here's how-



Inset — A battery of Semet-Solvay Waste Heat Boilers used as heat exchangers for the generation of process steam in a Gas Producer Plant.

lime and cement makers can put "waste heat" to work

Waste heat boilers are the most efficient means of converting Btu's, that would otherwise be wasted, into energy for steam for use in your plant.

A principal supplier of waste heat boilers to the gas industry for 27 years, Semet-Solvay Engineering Division is now able to make its experience in heat exchange equipment available to manufacturers of lime and cement.

Shipped ready for installation, Semet waste heat boilers have a high steaming rate, low maintenance cost. We invite your inquiries.

SEMET-SOLVAY ENGINEERING DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector St., New York 6, N. Y.

Allied Chemical

Secondary, gyratory type crusher is under cover. No scalper screen precedes this crusher

percent of the company's business is private construction with the balance going to the state and county. The material is said to meet all specifications.

The plant is partly enclosed and operates dry. Belt conveyors do all the interplant transportation.

The primary crusher is fed by a 36-in. x 10-ft. Lippman apron feeder. Under the primary crusher is a 30-in. belt conveyor that receives the impact of falling rock from the crusher and places the rock on a belt conveyor taking the material to the 16-B Telsmith secondary crusher without intermediate screening. This belt and the succeeding one are 30-in. and the other two are 24-in. Throughs from the 16-B Telsmith are moved by belt conveyor to a 4- x 12-ft. three-deck screen with the plus fractions going to the 4-ft. cone crusher. Throughs from the Symons cone go by belt conveyor to a 5- x 14-ft. Simplicity three-deck screen and the plus fractions are sent by belt conveyor to two screens that operate in parallel; one is a 4- x 14-ft. Seco and the other a 4- x 12-ft. Lippman. Plus fraction from both screens goes to the 4-ft. cone. Both are double-deck screens. The plant was designed by Lippman Engineering Works. The flow diagram gives the essentials of the flow of material.

Leslie W. Perkins is president of the Falls City Stone Co. W. R. Harrod is vice-president and general manager, and Claude Cox is plant superintendent. The company was reorganized, effective September 1, 1953, with a change in name and election of new officers.

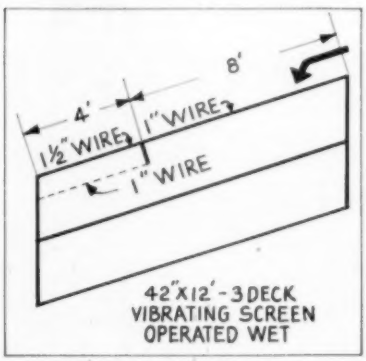
Dredging Operations

R. M. HENRY GRAVEL CO., Sterlington, La., recently began sand and gravel dredging operations on the Ouachita river near Camden, Ark. Plant facilities include the dredge, a towboat and six barges. The company expects to produce and market about 3000 tons of sand and gravel per month.

High Value By-Products

(Continued from page 92)

As the gravel is relatively small, the flow of material is quite simple. The truck hopper has a Jeffrey vibrating feeder to the belt conveyor that serves the plant. There are two vibrating screens in the plant; both 3½ x 12-ft. Symons, operated wet. The first is a three-deck plus, and the other a two-deck. The line drawing illustration shows screen No. 1 which has an under-slung 4-ft. deck. This seems to give the desired gradation. Sand is



Details of split-deck No. 1 screen

recovered in a 48-in. Wemco sand preparation machine. All haulage is by trucks, most of which are company-owned. Truck scales are available at the plant. The plant has a capacity of 200 t.p.h. The company has available for stockpiling and other work, a 1-cu. yd. Model 41 Northwest clamshell, and a ⅜-cu. yd. 10-B Bucyrus-Erie clamshell.

Recover Gold and Black Sands

The San Joaquin river sources in the high Sierra Nevada mountains, and cuts through a great variety of rock formations, granites, schists, limestones and other types of sedimentary rocks. It cuts through the south end of the "Mother Lode," the famous gold-bearing belt of California. With this brief geological background, it might be expected that heavier mineral values could be present in the lower San Joaquin river gravels. When Friant dam was built about 15 years ago the aggregate plant for the concrete had a very modern gold recovery plant as an adjunct. These operations were described in ROCK PRODUCTS.

Pit to plant haulage with 14-cu. yd. truck. Arrow points to drain spout that hits tires

Stewart & Nuss, Inc., at plant No. 2 has gone a step further and have an experimental plant that is recovering not only some gold but most of the black sands as well. These sands are said to contain ilmenite, zircon, and monazite as well as magnetite. The latter accounts for about 50 percent of the bulk with the ilmenite running about 30 percent. Ilmenite is a titanium mineral of economic value. Zircon is a rare mineral silicate of zircon, and monazite is one of the rare cerium phosphates. As these minerals all have a relatively high sp. gr., they can be recovered gravimetrically as a bulk concentrate that must later be processed to separate the identical mineral constituents. The company has two concentrating tables in a "dog-house" constructed alongside the Wemco sand screw. A fractional cut is taken out of the sand stream and sent to the tables. The tables are currently recovering about 500 lb. per day of black sand that has a value in the $300 (plus) per ton range. In the total sand output there is said to be 3-5 tons of black sand that possibly could be recovered. The experimental work is under the direction of Harry Bush, a gold miner and mill man with a very wide experience in gold and other mining fields.

Charles W. Stewart is president of Stewart & Nuss, Inc., and Ben Evernett is superintendent of the black top and sand and gravel plants. Fred Lindsey is foreman at plant No. 2.

Testing Resistance to Aggressive Solutions

IN TESTING FOR RESISTANCE to aggressive solutions, prisms were prepared from portland cement with a variety of admixtures, which were supposed to improve resistance to chemical attack. Crushed stone was used as aggregate, which allowed more rapid attack. Of these, a mixture composed of two parts of portland cement and one of Thurament gave the best showing in magnesium sulfate solution. The destruction seemed to coordinate with the amount of lime leached from the concrete. Only aluminous cement made a better showing. The attack of distilled, tap or carbonated water on Thurament was quite small. The specimens stored in 15 percent magnesium sulfate solution were destroyed in 300 days; those in 5 percent solution of the same salt, 500 days. (G. Mall, *Zement-Kalk-Gips*, Vol. 5, No. 12, p. 401, Dec., 1952.)

Limestone Plant

LIVINGSTONE STONE CO., INC., Pontiac, Ill., is completing a major expansion program at its limestone quarry near Pontiac. The new plant will provide finely ground limestone for livestock feeds and for agricultural uses. New facilities includes fine-grinding equipment, a drier, a 75-ft. elevator, a 140-ton storage bin and a bagging machine.

HIGH QUALITY LIME

with Minimum Fuel and Labor Cost!

200 TON PER DAY PLANT OPERATING AT LOW COST

This typical example of KENNEDY modern lime plant is in operation at Cal de Apasco, Apasco, Mexico. Equipped with 10′ x 150′ Kennedy rotary Kiln, with preheater and deheater and internal heat exchanger, this modern plant produces more than 200 tons, daily, of high quality lime. Operation and maintenance costs are low, labor requirements are minimum, fuel consumption extremely low.

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KVS machinery and equipment is designed and built to serve specific uses . . . *known* to operate properly and at lowest cost under all conditions . . . proven best through a half-century of use in leading plants throughout the world.

Our engineers are available for consultation anywhere, anytime. Send for bulletins describing KVS lime, cement and mining machinery.

200 TON PER DAY LIME PLANT—10′ x 150′ KENNEDY KILN WITH PREHEATER, DUST CHAMBER AND BY-PASS STONE FEEDER

10′ x 150′ KENNEDY KILN WITH PREHEATER AND DEHEATER WITH INTERNAL HEAT EXCHANGER

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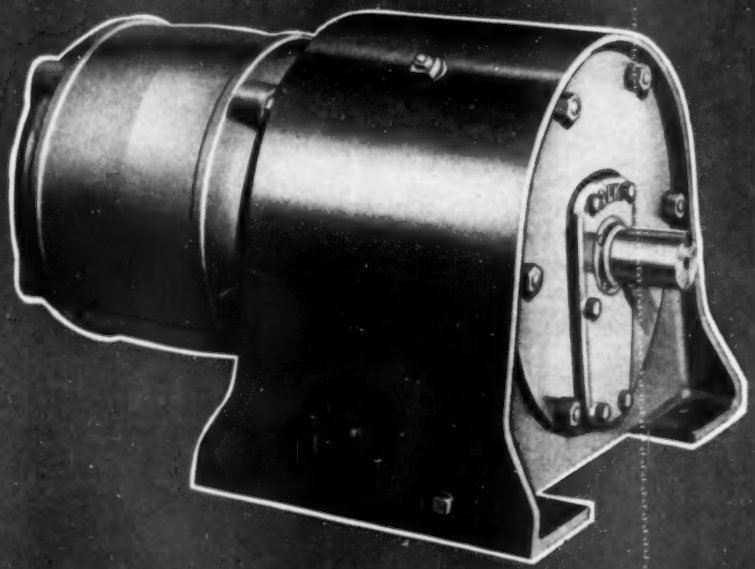
ALL-STEEL FALK Motoreducer

(Gearmotor Type–Supplementing Falk All-Motor Line)

. . . with completely standard round-frame, D-flange motor



Check and Compare these features...

Meet a faithful old friend in a new, modern dress! The famous, time-proved Integral Type *all-steel* Falk Motoreducer (Supplementing Falk All-Motor Line) has been redesigned into a compact, streamlined unit providing the utmost in space economy—but retaining all the application versatility, long-life performance, easy-maintenance features and superior structural qualities that have made Falk Motoreducers the recognized standard throughout industry.

In this new Integral unit—rated in accordance with AGMA standards—a *completely standard* round-frame, D flange NEMA motor is mounted directly on the all-steel Motoreducer housing. The motor remains a separate piece of equipment, readily replaceable with any other type or make. Output speed (ratio) can be changed within unit's torque capacity without modifying motor. Size and arrangement of the standard housing permit wide ratio range—from 3.36:1 to 542:1.

In order to meet the greatest number of industrial application needs, the newly designed Integral Motoreducers are available in horizontal and vertical models, both in concentric and right-angle types; double, triple and quadruple reduction; horsepower range, 1 to 40 HP. Prompt stock shipment in standard ratios is offered.

Whatever your reduction requirements, you get greatest dollar-for-dollar value in the long run by standardizing on Falk products. Write for Bulletin 3104.

Every FALK Motoreducer has these "In-built" Factors—

Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

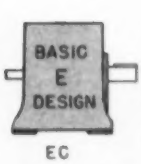
All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Sealed Housings. Dual closures and one-way vents keep oil *in*, dust and moisture *out*. Units are splash-proof, leakproof, dustproof.



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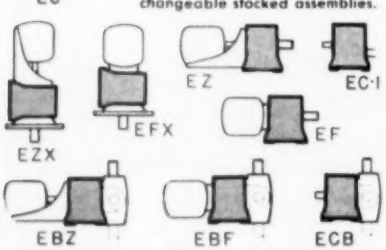
The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.



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WRITE FOR BULLETIN 3104

INFORMATION

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

1 AIR HEATER—American Air Filter Co., Inc., has released a sheet describing the redesigned Herman Nelson portable air heater. Specifications and photographs are given as well as typical applications.

2 AIR VIBRATION EQUIPMENT—The Cleveland Vibrator Co. recently published Catalog No. 109, illustrating and describing its line of air vibration equipment. Typical application photographs, specification tables and an engineering data sheet are included.

3 A.S.T.M. RESEARCH—American Society for Testing Materials has announced the availability of reprinted copies of the "Review of A.S.T.M. Research," as published in the December, 1952, and the January and February, 1953, A.S.T.M. Bulletins. The 28-page reprint, prepared by the A.S.T.M. administrative committee on research, summarizes the work of the various technical committees as of May, 1953.

4 BELT CONVEYORS—Barber-Greene Co. has issued Catalog 76A describing and illustrating its standardized belt conveyors and accessories. Typical conveyor layouts and installation photographs are also included.

5 BIN LEVEL INDICATOR—Robertshaw-Fulton Controls Co., Fielden Instrument Div., has released an eight-page bulletin illustrating and describing the Telstor electronic level indicator.

6 CEMENT PACKING MACHINE—F. L. Smidth & Co. has published a booklet describing and illustrating the Rotary Fluxo packer, a high-capacity, automatic, cement-packing machine. Installation and operational data are included.

7 CHAIN OILING SYSTEM—Oil-Rite Corp. has released Bulletins 69-30, 69-31, and 68-72 describing a chain oiling system for lubricating a number of individual chains, or oiling the sides of chains. Drawings, photographs, specifications, and construction, application and operation data are given.

8 CLINKER COOLER INSTRUMENTATION—Minneapolis-Honeywell Regulator Co., Industrial Div., discusses the theory and practice of automatic control of inclined grate clinker coolers in Instrumentation Data Sheet No. 1.1-3. Pneumatic and electric control systems, each including temperature and pressure control, are described.

9 CONCRETE DARKENER—A. C. Horn Co., Inc., has brought out a six-page brochure describing AE (air entrainment) Dispersed Black, a scientifically formulated black dispersion for use in darkening air-entrained concrete. Typical application photographs are given.

10 CONTROL VALVES—C. B. Hunt & Son, Inc., has announced Catalog 531 describing the "Quick-As-Wink" line of air and hydraulic control valves, valve couplings, etc. Sectional views of body, plunger, packing and interior operation are given, and sizes, pressures and temperatures are also listed.

11 CONVEYOR SYSTEMS—Knapp Mills, Inc., has announced a technical paper entitled, "Materials Handling for Industry," discussing the hyperbolic principle applied to conveyor belts, steel band conveyors or cable hauling. Questions on proper installation and maintenance of Guidlers are answered in detail.

12 CONVEYOR—The Fairfield Engineering Co. has released a four-page bulletin describing and illustrating the Builder conveyor. Typical application photographs are included.

13 CRANE-DRIVE EQUIPMENT—General Electric Co. has announced a 12-page bulletin, GEA-5408A, describing and illustrating d-c crane-drive equipment. The built-in magnetic brake, as well as other components and accessories, are described and illustrated. Cutaway and "blown-up" views of crane motors and control, and typical speed-load and performance curves are included.

14 CRANES AND SHOVELS—The Thew Shovel Co. has released a 12-page bulletin illustrating and describing the Lorain "80" series of power shovels and cranes. Design and construction features and individual working parts are presented through photographs and cutaway views. Typical application photographs are also included.

15 CRANE-SHOVEL DEVELOPMENTS—Unit Crane & Shovel Corp. has published Bulletin U-953 giving complete engineering data on a heavy-duty undercarriage for its Model 1520 mobile crane; Alumetallic clutches for its shovels or draglines; "Gooseneck Trenchoe" boom for the Model 1020 excavator; and torque drives for its ½-cu. yd. diesel-powered machines.

16 CRAWLER CRANE EXCAVATOR—Schield Bantam Co. has issued a brochure describing and illustrating the C-35 crawler crane excavator. Specifications, engineering data and parts and attachment photographs are given.

17 DIAL THERMOMETERS—The Foxboro Co. has issued Bulletin 467, describing and illustrating dial thermometers for long distance measurement. Data on temperature indicators of the vapor pressure and gas pressure types are given. Construction details, bulbs, tubing and accessory data, and diagrams, showing installation methods, are also included.

18 DIESEL ENGINES—Caterpillar Tractor Co. has published Form 30795, illustrating the use of its diesel engines and electric sets in mining operations. Individual job descriptions and a specification sheet are included.

19 DREDGING LADDER—Eagle Iron Works has issued Catalog 83 explaining the "Swintek" traveling screen chain dredging ladder. Its design, construction, applications and operation details are given. Typical application photographs are included.

20 ELECTRIC SHOVELS—Harnischfeger Corp. has published Bulletin X-139 describing P & H electric shovels. Full color photographs show equipment at work in typical applications. A description and cutaway drawing of the Magnetorque drive are also included.

21 ELECTRONIC CONTROL—Photoswitch, Inc. has released a revised edition of an electronic control handbook entitled "Cutting Production Costs with Electronic Controls." Included are 42 case studies explaining how weighing, counting, measuring, timing and cycling operations are handled through electronic control.

22 ENGINES—Caterpillar Tractor Co. has released Form 30743 describing and illustrating the applications of six engines, including industrial and marine engines, and diesel electric sets.

23 FEEDERS — Richardson Scale Co. has made available Bulletin 5202 describing and illustrating the constant-weight continuous feeder. Specifications and descriptions of basic parts and accessories are given. Maximum capacity tables, dimensions and a four-view engineering drawing are also included.

24 HARD-FACING — Alloy Rods Co. has published Bulletin AR53-20 on Wear-Arc hard-facing electrodes and Wear-Flame hard-facing rods. An application guide is given covering types of wear, wear parts and the correct electrode or rod to use for various applications.

25 INDICATORS—Leeds & Northrup Co. has published Catalog ND42 describing and illustrating its manually-operated indicators for temperature, electrolytic conductivity and pH measurements. Specifications, tables and line drawings are included.

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26 INDUSTRIAL CHEMICALS—Consolidated Chemical Industries, Inc., is celebrating its 75th anniversary in the industrial chemical field with the publication of a 104-page catalog. A complete history of the company's growth and various products is given as well as photographs of its 11 plants. Product descriptions, specifications, technical data, including tables and graphs, and packaging and shipping information are also given.

27 JACKBITS—Ingersoll-Rand Co. has issued Form 4146 illustrating and describing the complete range of Carset jackbits. A selection guide is also given.

28 MATERIALS HANDLING EQUIPMENT—The Yale & Towne Manufacturing Co. has released a catalog entitled, "Yale Picture Story of Materials Handling Equipment." Gas, electric and hand-lift trucks, hand and electric hoists, and palletless material-handling attachments are illustrated and described. Typical application photographs are included.

29 MILLISECOND DELAY BLASTING—Atlas Powder Co., Technical Div., has issued the first of a new quarterly technical bulletin entitled, "Better Blasting." The bulletin features an article on millisecond delay blasting with eight photographs depicting the sequence of the blast.

30 PORTABLE AIR COMPRESSORS—Davey Compressor Co. has released Form E-247 describing its gasoline, diesel and electric portable air compressors. Photographs and brief specifications are included.

31 POTENTIOMETER—Minneapolis-Honeywell Regulator Co., Industrial Div., has issued Bulletin 1210 describing portable potentiometers, with direct reading temperature, millivolt, and extended range scales. Wiring diagrams, instructions, specifications and features are also included.

32 POWER CONTROL UNIT—The Baker Manufacturing Co. has issued a four-page folder illustrating and describing the PCU-75 power control unit. Performance details and full specifications are included.

33 POWER TOOLS—Thor Power Tool Co. has announced a 40-page catalog, No. 39-A, describing and illustrating its portable electric power tools. Specifications are given and accessories and attachments are also shown.

34 PRESSURE PIPE—Taylor Forge & Pipe Works has published the first issue of its house organ. The 46-page booklet describes and illustrates its plants, literature, and products which include flanges, reducers, seal chambers, welding necks, nozzles, and various type pipe. Stress tables are also given as well as codes and standards for the piping and pressure-vessel fields.

35 PRE-STRESSED CONCRETE—Baldwin-Lima-Hamilton Corp., Testing Equipment Dept., has available Vol. 8 No. 2 of "Testing Topics," featuring four articles entitled, "Wire Tensometer for Prestressed Concrete Research;" "Good Casting Design-On Purpose," a picture-ception story; "A New High Range Strain Gage;" and "Anolog-to-Digital Conversion."

36 PYROMETER SUPPLIES—Minneapolis-Honeywell Regulator Co., Industrial Div., has brought out a revised edition of Buyers' Guide 100-5, describing and illustrating pyrometer supplies. Thermocouple assemblies and components are listed, and selection, maintenance and application data are also included.

37 ROAD SANDER—Tenna-Lite Corp. has released a folder describing and illustrating the use and operating principle of the Grip-King, an electronic road sander for automobile installation to protect against skidding on icy roads.

38 ROLL CRUSHERS—Lippmann Engineering Works has announced Bulletin 1120 describing and illustrating features of its roll crushers. Cutaway views are given and dimension and specification tables are also included.

39 ROLLER CHAIN SPROCKETS—Morse Chain Co. has issued a 16-page, pocket-size catalog, B55-53, listing prices and specifications for Taper-Lock stock-roller chain sprockets. Horsepower ratings and selection tables, installation and removal procedures, and service factor tables are also included.

40 SILICONES—Dow Corning Corp. has released a booklet entitled "Tall Tales and Fabulous Facts." Data is given on various silicone uses such as in lubricants, electrical installations, water repellents, rubber, etc., and humorous legends are described.

41 SOIL-CEMENT TESTING—Portland Cement Association has released a booklet entitled, "Short Cut Soil-Cement Testing Procedures for Sandy Soils." Step by step procedures are given along with graphs and classifications.

42 SPEED-REDUCERS—Westinghouse Electric Corp. has released Bulletin B-5646, describing its line of speed reducers. Equipment features, manufacturing techniques and applications are discussed. Special units developed for right-angle drives and in-line drives are also described.

43 STEEL BALLS—Frazer & Co., Inc., has announced a leaflet describing Fischer steel balls and their applications as bearings in valves and pumps, as casters, burnishing balls, gauge balls and crushing and grinding balls.

44 TRACTOR-SHOVEL—Frank G. Hough Co. has released Catalog 255 describing and illustrating the "Payloader" tractor-shovel. Typical application photographs and detailed specifications of the seven sizes are given.

45 TRUCK CRANES—Thew Shovel Co. has released a booklet giving on-the-job views of 6-ton Lorain TL-10 truck crane installations. Job data and illustrations of various front-end attachments are given.

46 TWO-WAY RADIO—General Electric Co. has announced publication of an illustrated booklet entitled, "How to Modernize Your Materials Handling Operations." The uses of its two-way radio in various industries are described and illustrated, and a resume of F.C.C. licensing regulations is given.

47 VIBRATING SCREEN—Hewitt-Robins, Inc., is distributing Booklet 122-J describing and illustrating the Style J Vibrex vibrating screen. Design and construction features are given as well as application, installation, and operation data. Dimensions and specifications are also included.

48 VOLTAGE STARTERS—Allis-Chalmers Manufacturing Co. has announced a booklet, No. 14B6410B, describing and illustrating the Type H starters for controlling squirrel-cage, synchronous, wound rotor and multi-speed motors. Diagrams and dimensions are also given.

49 WEIGH BELT-METER—Minneapolis-Honeywell Regulator Co., Industrial Div., has brought out Instrumentation Data Sheet No. 10.18-3, describing the Trans-Weigh Co. belt meter for continuous weighing of a steady flow of loose material on a conveyor belt, and the recording of the flow rate, as well as the totalizing of the accumulated tonnage. An "ElectroniK" instrument is also described for use as the recorder and totalizer.

50 WIRE ROPE—Bergen Wire Rope Co. has issued a bulletin entitled "Guide to Selecting Wire Rope," giving characteristics of wire rope and selection data. Various uses, proper applications, and a looseleaf sheet for tabulating operating conditions, as an aid in writing wire rope specifications, are also included.

51 WORM GEARS—The Cleveland Worm & Gear Co. has brought out a booklet entitled, "Why Worm Gear?—Why Cleveland?" Typical worm-gear speed-reducer installations are illustrated.

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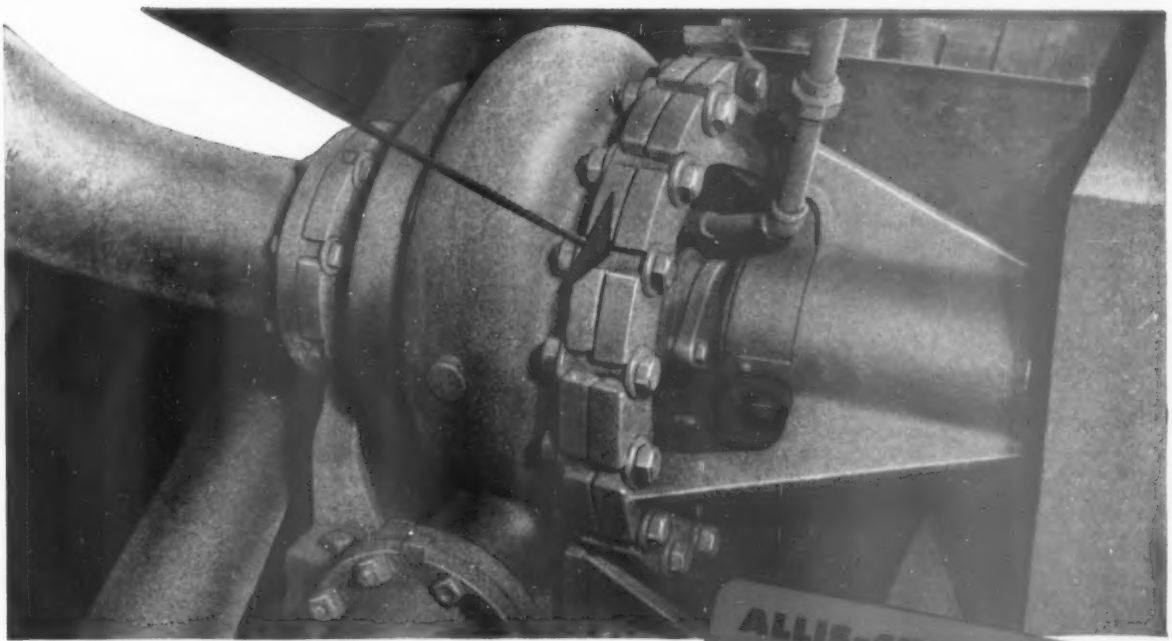

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- **All maintenance points are easy to reach**
- **Pump can be taken down and returned to service in less than a half hour**
- **Many parts are interchangeable between different pump sizes**

THE Allis-Chalmers solids handling pump is ruggedly built to stand rough solids handling service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers solids handling pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

Complete Pumping Unit Furnished . . .

Allis-Chalmers can furnish the complete pumping unit — pump, motor, *Texrope* drive and control — assembled and ready to install and run. A *Vari-Pitch* V-belt drive makes it possible to vary head and capacity at the turn of a crank.

Get the Complete Story . . . Every Allis-Chalmers solids handling pump is application engineered by a specialist who knows solids handling equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee 1, Wisconsin and ask for Bulletin 52B6381.

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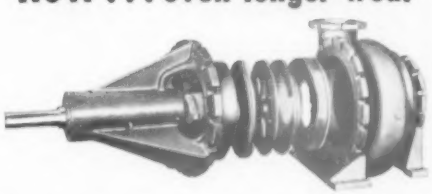

Impeller and suction plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear, lower pumping costs.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

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Associations Increasing Industry Service

Director's meetings of National Sand and Gravel Association and National Ready-Mixed Concrete Association at Colorado Springs discuss legislation, engineering studies and labor problems

UNDER CLEAR COLORADO SKIES, at the foot of the Rocky Mountains, the semi-annual meetings of the Boards of Directors, National Sand and Gravel and National Ready-Mixed Concrete Associations, with their side-trip diversions, were both delightful and instructive. The get-together really began at East Coast points, where the producers and their wives boarded three special bedroom and compartment cars in a personally conducted party under the supervision of Ralph L. Preble of the United States Travel Agency, Inc. Others from the Central West joined the party at Chicago.

After a get-together party in the dining car on the train, and dinner, and a night's sleep, the party left the train at Denver, Colo., the following morning on a sight-seeing trip to various points of interest, leaving in the afternoon in the same cars for Colorado Springs, where the meetings were held the following three days at the Broadmoor Hotel. Most of the members returned to Chicago on Thursday, following, in the same cars.

Joint Meeting of Two Boards

According to custom, one full day's session was devoted to a joint meeting of both Boards, which economizes in time since it avoids repetition of various subjects in which all are equally interested. This session was opened with a review of the year's progress—and of unfinished business—by the president of the National Sand and Gravel Association, Albert R. Shiely, St. Paul, Minn. Among the problems still before the industry, he mentioned some of those of greatest importance as (1) resistance to various proposed amendments to the Taft-Hartley Act which would restore to labor-union bosses all the power they so frequently abused before passage of the law; (2) the job of keeping on the statute books the percentage depletion allowance for the industry in its income tax accounting; (3) expansion of the safety campaign of the industry; (4) work for amendment of the federal tax structure to encourage more private initiative; (5) keep the plants in tip-top operating condition with new equipment; (6) work to get ready-mixed concrete out of the present possibility of price renegotiation (sand and gravel already is).

Two subjects that always arouse considerable round-table discussion are the future meeting places for coming annual conventions, and Board meetings. V. P. Ahearn, executive secretary, led off the discussion with a recital of plans for the 1954 convention in Chicago. He said the exhibit space at the Conrad Hilton Hotel was already sold out, and if more exhibitors sought space the Association managements would be faced with the necessity of reducing the amount of space allotted to some of the large exhibitors. Otherwise the program details will be pretty much as they have been in recent years, with more and more emphasis on industry business and less and less on entertainment.

The off-year conventions in 1955 and 1957 will be held in Miami, Fla., and Los Angeles, Calif., respectively. The 1956 convention which involves another exhibit, will presumably be held again at the Conrad Hilton in Chicago, as this is at present the only hotel that can provide the necessary facilities. But even these facilities are not equal to the desires of some exhibitors, and consequently there has been and still is considerable sentiment among these exhibitors to abandon hotel shows in favor of larger exhibits in outside auditoriums or exhibition halls. This matter was thoroughly discussed at the joint meeting of the Boards, the pros and cons being placed before the group very fairly and clearly by Secretary Ahearn. The Boards voted practically unanimously not to go to outside exhibits, at least before 1958, but promised to keep an open mind on the subject.

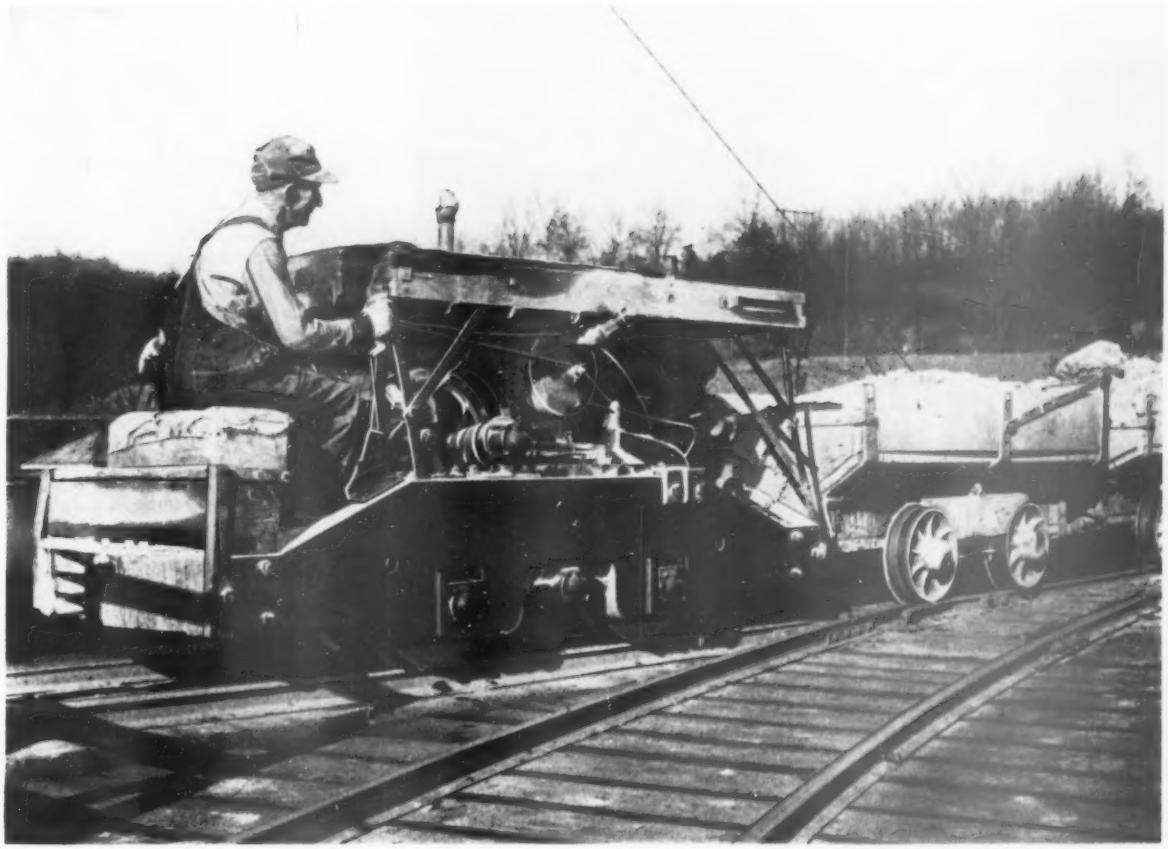
Next summer's Board meetings, according to unanimous vote, will be held in Murray Bay, Que., and the trip will include sight-seeing in Quebec City and Montreal with an overnight voyage on a ship on the Saquenay River. The party will be conducted, as was the case this year, by the United States Travel Service, Inc. The tentative date is the third week in August, 1954.

Special cars were allotted to the directors and their wives on the trip to and from the meeting at Colorado Springs. Vince Ahearn, shown to the left, is listening in on this "conference" before entraining

Engineering Subjects

Stanton Walker, director of engineering, outlined the research work in progress at the Associations' laboratory, University of Maryland. Of latest interest is work on bituminous concrete mixtures. Among other points he raised was that about 70 percent of the problems the associations tackle come to the laboratory from individual member producers. He raised the question whether some of this work should not be paid for by the interested producer. However, he said, about half of the research work thus undertaken develops information of general interest to the industry. No action was taken by the Boards, which appeared to be satisfied with the present set-up.

Mr. Walker also brought up the subject of supplementing the present short course each year on concrete and concrete aggregates at the University of Maryland with a similar course on operation of sand, gravel



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A very excellent attendance of ladies was present at the meeting. Here a few of the party may be seen

and ready-mixed concrete plants. He said he had received numerous requests for such a course, but explained the difficulties involved, and nothing specific was recommended by the Boards. The completion of the tests on commercial mixer trucks was referred to, but an abstract of the report was reserved for the subsequent meeting of the Board of the National Ready-Mixed Concrete Association.

Other Joint Activities

The joint group life insurance plan of the two associations is now in operation with 369 insured employes of 23 member companies. The administrative work is done by the Associations' headquarters staff, and the insurance carrier is the John Hancock Insurance Co. of Boston, Mass.

Secretary Ahearn reviewed the labor-managment relations in the industry. Herbert Jahncke, president of the National Ready-Mixed Concrete Association, presiding at this session described the longest and most serious strike in the history of the construction industry at New Orleans, La. The producers by acting cooperatively were eventually able to win their main points, but the strike was very costly to both strikers and industry. Similar strikes in the Metropolitan District of New York City and in St. Louis and Kansas City, Mo., were discussed. Truck drivers in New York were asking a 75¢ per hour increase, a lot of fringe benefits and 11 paid holidays a year. The strike had already lasted 9 weeks at the time of this Board meeting. Some small operators had settled for 50¢ per hour and 5 percent fringe benefits. Among other demands here and elsewhere is paid holidays for the individual employe on his own birthday! In Kansas City the longest strike on record was settled for a 10¢ per hour increase with 2½¢ more next April. The strikers asked a 25¢ increase. In St. Louis a 22¢ per hour increase resulted in a two-year contract. Here owner-drivers of trucks have been forced into the union. All the evidence presented was to the effect that Dave Beck, the new president of the teamsters' union, is a ruthless and powerful labor-union boss. Mr. Ahearn then took up the subject of possible federal legislation to revise the Taft-Hartley Act. He said that industry itself is divided on what revisions should be made. He said the President will certainly propose some revisions, but that the Congress could be depended upon to have the last word. He thought the proposed Lucas bill to prohibit industry-wide bargaining should be opposed.

Mr. Ahearn, referring to the federal tax situation, expressed an opinion that there was little likelihood of reduction of the corporate tax next year; there were likely to be new revenue-raising measures. In the obvious attempt to balance the national budget in so far as possible he thought that federal aid to highways was in some danger. As to legislation specifically permitting manufacturers to meet in good faith the lower delivered price of a competitor, he saw no likelihood of such a bill being presented early. Some manufacturers are already doing so under a recently announced policy of the federal Justice Department, but the law is still ambiguous. The status of the industry for the current year, and the prospects for next year, were discussed informally around the table. In general 1953 appeared to be providing nearly as much volume as 1952, but predictions for 1954 were more cautious.

Legislation that still needs attention, according to Secretary Ahearn, is clarification of the jurisdiction of the wage and hour law. So far there have been various court decisions both favorable and unfavorable to local producers furnishing materials for structures deemed to be used in interstate commerce. Another legal matter in the balance is interpretation of the 3 percent tax on haulers of property for hire. Some one should be paying this tax, and possibly the hired hauler is not fully aware of his responsibility.

Ready-Mixed Concrete Board

On Tuesday afternoon, the Board meeting of the National Ready-Mixed Concrete Association opened with an address by Herbert G. Jahncke, president. He said of special significance was a change in sales policy by a few cement companies, of making a single delivered price to all types of purchasers. This eliminates previous discounts to dealers, ready-mixed concrete producers, block manufacturers, etc., and consequently places the ready-mixed concrete producer in sharper competition with the contractor who mixes his own concrete on the job. President Jahncke spoke very favorably of local meetings of producers he had attended, and of a meeting of the Truck Mixer Manufacturers' Bureau, and the work it is doing jointly with the Association.

The financial condition of the Association is in a very healthy condition, and it has entered on a 50-50 basis with the National Sand and Gravel Association on a retirement-salary plan for employes on the Association's staff, which will be referred to in more detail in the report of the Sand and Gravel Association's Board meeting. Since the 1953 annual conventions 44 new active members and 5 new associate (machinery) members have joined, making about 650 active members. However, Secretary Ahearn said there are still about 1000 other producers who should be members, although the membership already represents a majority of production.

Engineering Matters

Most of the remarks by Stanton Walker, director of engineering, had to do with the tests of concrete truck-mixers, made in cooperation with the Truck Mixer Manufacturers' Bureau. The complete test data are now available to those interested, together with the interpretation put on them by Mr. Walker and his assistant, D. L. Bloem. These conclusions in brief are: (1) for a given number of revolutions, there is no discernible difference in efficiency between slow operating speeds (3 to 5 r.p.m.) and fast speeds (9 to 12 r.p.m.); (2) under proper operating conditions good concrete can be produced at either slow or fast speed; (3) there was quite conclusive evidence that for capacity-sized batches 50 revolutions produced satisfactory mixtures; (4) an additional ½ cu. yd. could be mixed in mixers rated at 4½ cu. yd. capacity; (5) prolonged mixing of air-entraining concrete had no significant effect on its characteristics; (6) analysis of strength data shows variations in the coefficient of variability of approxi-

(Continued on page 123)

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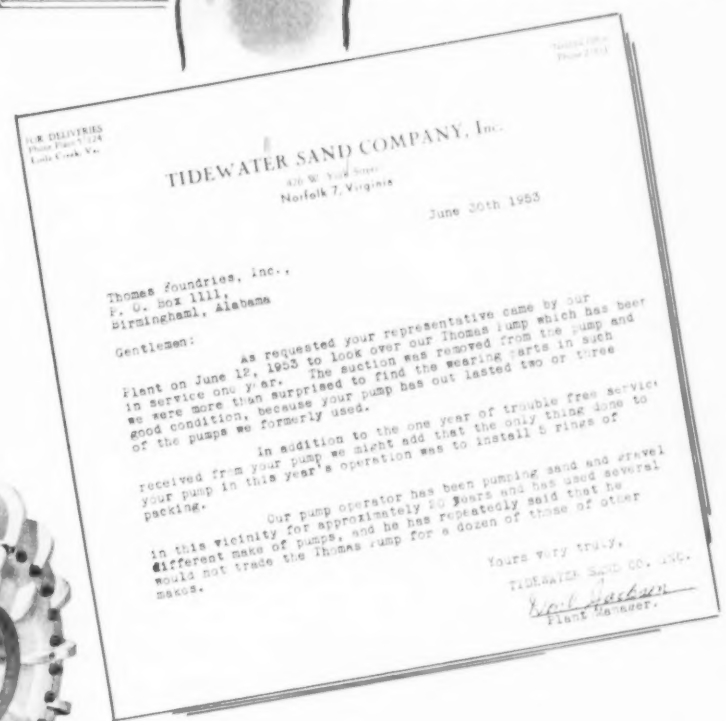

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June 30th 1953

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Yours very truly,
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Thomas Durable Dredge Pump

Mr. Jackson's letter above is only one of a series of testimonial letters written by Thomas Pump owners and published by us during the past two years. Reprints of the others are available if you wish to see them.

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Cement and Quarry Section, National Safety Congress program includes talks on management responsibility, plant safeguards, medical requirements, training and educational aids, and the work of the plant nurse

Left to right: T. W. Jones, Dr. J. L. Rosenstein, M. C. M. Pollard (chairman), Kent Jander, Lea P. Warner, Jr., and Gil. G. Grieve

Making the Safety Program Effective

THE WEEK OF OCTOBER 19-23, 1953, again brought to Chicago the annual meeting of the National Safety Congress and Exposition. This congress attracted a large attendance of delegates including company representatives, safety engineers and educators from all parts of the United States. Headquarters for registration and exhibits was the Conrad Hilton Hotel.

The Cement and Quarry section held a three day meeting. General chairman M. C. M. Pollard, director of safety, National Gypsum Co., Buffalo, N.Y., was presiding officer. Mr. Pollard, in delivering the welcoming speech, described the policies and aims of the section. Interest in the section continues to grow and the Membership Committee reported a gain over last year of six percent.

Vice-Chairman T. W. Jones, New Haven Trap Rock Co., New Haven, Conn., asked all members to continue their contributions and information and to utilize the News Leiter to exchange ideas. This, he pointed out, is the one way the Association can present ideas and problems to the membership for discussion.

Management Responsibility

The first paper, "A Cement Executive's Attitude Toward Safety," was given by John Mather, vice-president, Lone Star Cement Corp., New York, N.Y. Mr. Mather emphasized that no safety program, regardless of its scope and coverage, is of any value either to the employe or employer unless it has the wholehearted support of top level management, and the cooperation of all the employes. The employes must have the belief that safety for them is based on a sincere interest by the executives of the company, and the foresight for their well being and safety is that of a fellow human being.

Mr. Mather used his "four M's" to utilize the essence of a sound safety program. The four M's were machinery, materials, money and men. No longer does a producer believe in the theory of old, broken down, get-by type of machines, he said. Instead, he utilizes new engineered safety design. The transformation process and transportation in a safe manner by efficient and safe handling was next outlined. The producer should not think of money in terms of strict economy, which is generally the executive's main duty to his partners and stockholders. He must realize the value and economy of a safer operation and an efficient safety program. This is a sound financial investment, emphasized by Mr. Mather. Men are the most important of the four M's, he stressed, regardless of the size and scope of the operation, how modern the machinery be, how good the material is, or how much operating money is available. Without the loyalty and cooperation of men, a company cannot have the most efficient organization and production. It is up to the executive to instill in all his employes that he has a very real and personal interest in the safety and welfare of each individual.

Plant Safeguards

Clarence F. Stetser, general superintendent, New York Trap Rock Corp., Newburgh, N.Y., in a talk, "A Crushed Stone Superintendent's View of Safety," outlined the safety program as carried out in his company's plants. He started with drilling, and described the regular safety gear used throughout, including the use of liners in hard hats for winter and chin straps to prevent the wind from blowing off the hats. Safety shoes are required to be worn by all employes where there are hazards.

To promote the use of safety goggles the company supplies prescription goggles to all employes according to requirements. It also assumes the examination cost. Power cable accidents when plugging in cables while power is on, are guarded against by use of a switch that must be off before a connection can be made. The same arrangement is used on main line and electric motor connections.

Mr. Stetser explained that due to the extreme distance between drilling machines, it was desirable to develop a signal system. This is accomplished by the use of a Very pistol which fires a parachute-sustained colored flare. In the event of an accident, a regular red flare stick is used. This, he said, shows the exact location of the occurrence. Blasting is conducted with emphasis on safety features, plus special training in explosive handling. When all the wiring is completed, checked and tested, an extra set of caps is fired at a safe distance from the Primacord in the holes. This, he said, is a dress rehearsal, or a dry run test, of the entire wiring circuit and blasting switch. If the dry run is satisfactory, the caps are then fired.

Mr. Stetser said that although noise is not generally considered a hazard in some locations the New York Trap Rock Corp. provides an approved ear plug similar to that designed for use by the U.S. Air Force for the convenience of the men. They are used principally in the area of vibrating screens and crushers.

High voltage cables for power shovel operations, he continued, are handled with metallic hooks with wooden handles. The metallic part is rubber covered. The shovel operator is protected from flying particles by wire cloth and plexiglass.

Safety Committee

The plant safety committee consists of foremen, union stewards, assistant superintendents and superintendents. Meetings are held once a month.

In closing, Mr. Stetser pointed out that a plant which has a good accident record, can scarcely evaluate the prestige gained thereby and its ef-

(Continued on page 109)

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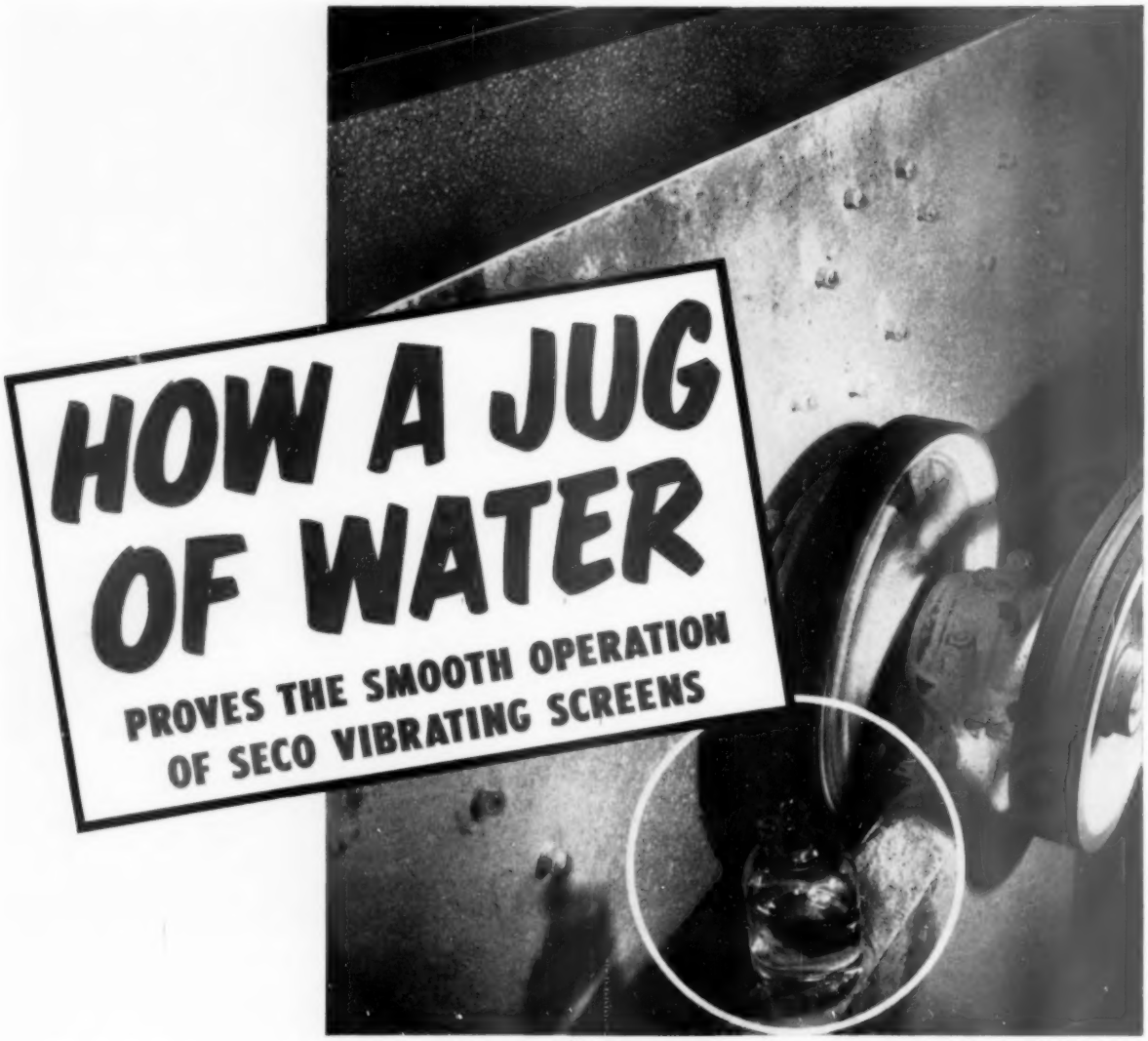

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fect on its employes and the community where the plant is located.

Foremen's Part

Edward Schwartz, superintendent, Thornton, Ill., plant, Material Service Corp., Chicago, Ill., covered "A Quarry Foreman's Part in a Safety Program."

Mr. Schwartz stressed that the foreman is the man to whom each new employe looks for his training and personal safety. He said that mechanical operation is relatively safe, but that the human element causes the greatest concern. Training the individual to think and act in terms of safety, to eliminate hazardous short cuts and unsafe practice due to lack of knowledge and experience, is the foreman's direct responsibility. In the training of a man stress must be placed on the importance of safety to his fellow worker, and the creation of harmonious teamwork, whereby each man will look for the welfare of the other. "Prevent accidents by teamwork" is the plant slogan. If an accident occurs, every effort is made to determine the cause and steps are taken to prevent recurrence.

Regular inspection and periodic safety meetings to discuss the findings and make suggestions on how to modify the danger or eliminate it, together with lectures by the safety engineer, round out the program.

By furnishing the men with approved safety equipment and proper training, the foreman acquires efficient workers, insuring continued production, a safe operation and a good cost record. The safe worker has proved to be a good worker.

Medical Requirements

A talk on safety from a medical viewpoint, was presented by J. F. McCahan, M.D., Liberty Mutual Insurance Co., New York, N.Y., on "Pre-Placement and Periodic Medical Examinations." The thought that pre-employment examinations would imply some arbitrary standard for employment is not the purpose of examinations. This impression sometimes excludes a possible useful employe. Preplacement examination is designed to discover the ability or capacity of the applicant so that an employer may place him at a job best suited to him so he will not jeopardize himself or his fellow workers.

A physical examination is not comprehensive enough, Dr. McCahan stated. It limits the physician to observations only. To enable the physician to adequately advise an employer he should have the past medical, family and occupational history. This allows him to evaluate the personality and mental competency of an applicant. Other points of an examination should include laboratory data and, in cases where indicated, X-rays should be taken. These components,

M. C. M. Pollard, chairman

Dr. McCahan explained, are the basic needs for a medical examination.

Selection of the examining physician should be, first, one who has the time to devote to the job; second, one who is genuinely interested in this particular type of work; and third, one who is willing to spend considerable time in plant inspection and familiarization. This permits him to evaluate an applicant's fitness for a specific job. Pre-examination, he added, should be performed prior to an applicant's being hired.

The physician's main responsibility is to interpret his findings to the employer, who is interested in determining what the man can or cannot do, not what is wrong with him. This enables the employer to visualize where best to place the man. Static defects should be shown and discussed with the employe so that he may adjust more readily to his job and allow him to work safely within his limitations.

A follow-up health program was recommended to arrest diseases in early stages and permit recognition of improper placement. To avoid a too ambitious program, it would be best to concentrate on employes exposed to toxic hazards, equipment operators, executives, accident repeaters and returnees from illness.

The similarity of the selective placement and health program was compared to that of placement and maintenance of machines and materials. Certainly it follows that thoughtless purchase and maintenance of machinery and careless selection and storage of materials are conducive to production losses. An employer is a purchaser of manpower, essential to a successful production. This requires a properly placed, healthy and safe employe.

The Plant Nurse

Elizabeth Fritz, R.N., Cedar Hollow plant, Warner Co., Devault, Penn., delivered a lecture on "Operating a Plant Dispensary and Its Tie-In with Public Relations." Nurse Fritz explained that companies employing between 100 to 500 employes are considered small plants. Since the plant she represents employes 164 people, it is designated as a small plant, and her information and remarks therefore had significance to the small plant operator.

In the early stages of industrial nursing, she said, it was primarily "home care." Few, if any, records were kept. First aid was occasionally given at the mill or quarry, but accident cases were sent to the doctor. This is in contrast to the present concept of occupational health; i.e., to protect, promote, improve and maintain the health of the employe but not as an 8-hr. activity. The industrial nurse's job is to aid men and women at their jobs and help them to build and maintain their health.

In considering a health program, Miss Fritz explained, the name is significant and to call the service first aid, plant dispensary, etc., would tend to limit the understanding of the service. She prefers the word "health" as it indicates a broader scope, implying prevention of illness, health promotion as well as caring for injuries and illnesses.

Industrial nursing is a service unit consisting of (1) maintenance department, to maintain and service the human machine; (2) sales department, to sell health, service and good will; and (3) safety department, to talk safety constantly. To be successful, the aims, purposes, values and benefits must be understood by all. Miss Fritz referred to the bulletin, "Small Plant Health and Medical Programs," Publication No. 215, published by the Division of Occupational Health of the U.S. Public Health Service. This book discusses various plans currently in use. She outlined the educational and personal requirements for a qualified plant nurse, gave in detail the equipment needed, and demonstrated by slides the use and location in the dispensary. Included in the slide exhibit were types of forms used and records kept. Also shown were the safety equipment, goggles, respirators, hearing protectors, etc., which are maintained as part of the dispensary.

In conclusion, Miss Fritz said that the consideration of both the tangible and intangible returns on the medical investment make it apparent that no industry, large or small, can operate at top efficiency without a health and safety program.

Psychological Aspects

In his opening remarks, "I would like to begin treating people like machines," J. L. Rosenstein, industrial physchologist, University of Miami, Coral Gables, Fla, was comparing the employers' attitude about men vs. machinery. Machines, he said, were designed for specific uses, to operate at rated speeds or to deliver specified

(Continued on page 110)

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12-yd. Heil Rock Body and Telescopic Hoist used in open pit mine hauling.

15-yd. Heil H-60 Rock Body with telescopic hoists. Heil bodies can be individually engineered to your requirements for body length and load distribution.

Heil 15-yd. H-60 Rock Body with 70° double-acting hoist in operation on the Mesabi. Heater arrangement in floor utilizes heat of exhaust to prevent ore freezing to body.

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CABLE POWER CONTROL UNITS

Safety Congress

(Continued from page 109)

power. As long as the specifications were adhered to, the equipment would do its particular job effectively. If it were overloaded or otherwise neglected it would fail to perform its function. Men should be treated similarly. If they are ill, injured or mentally upset, they require attention, otherwise they cannot perform safely or efficiently.

The employe who is in good health, surrounded by proper working conditions and safety devices, and has the job duties clearly explained, is in a position to deliver at maximum efficiency, said Dr. Rosenstein. Men, like machines, resent the use of force to compel them to do their job. A man will do a better and safer job when inspired by loyalty and because he takes pride in the discharge of his responsibilities, not just for the money involved or because the boss says so. Each man builds a mental picture of himself and will defend this objective to the exclusion of all else. Men basically are inclined to break the bonds of restraint, discipline and imposed authority. The foreman who can analyze the employe's personal picture of himself has the key to the development of efficiency, loyalty and safety in the man.

Visual Aids

M. C. M. Pollard, director of safety, National Gypsum Co., Buffalo, N.Y., spoke on "The Use of Visual Aids for Supervisory Training." He showed how the company utilizes a training course, with the supervisor as group leader, and uses a series of four one-hour courses, designed around a showing of sound slide films. The pictures are artist-drawn and show the safety programs as a row of dominoes. The dominoes, numbered from 1 to 4, are (1) the reason why; (2) the unsafe act; (3) the accident; (4) the result. The slide depicts the dominoes standing on end in numerical order and the sound strip explains how, if the first domino is knocked over, it will take each successive domino down with it. The four one-hour courses are (1) Production Efficiency and Accident Prevention; (2) Fundamental Facts of Industrial Safety; (3) Looking for the Cause; (4) How to Stop Accidents. At the conclusion of the discussion, Mr. Pollard made available to the members copies of the pamphlet "A Way to Efficient Production."

Film-Pictures

Seymore Fleming, safety director, New York Trap Rock Corp., Newburgh, N.Y., covered the many activities of his company in a picture series, "Selling Safety with Pictures." The pictures were actual on-the-spot photographs of scenes at the plant and quarry showing some of the unsafe practices he encountered in inspecting the plant with the camera. He showed the original picture of the

safety infraction or hazardous conditions, then followed with a picture showing the corrected action taken.

Safety Inspection

"Safety Inspections With a Camera" was the subject of a talk by A. B. Hoftiezer, safety supervisor, Laverack & Haines, Inc., Buffalo, N.Y. Mr. Hoftiezer spoke at last year's Congress and, because of the interest shown then, was asked to speak again at this session. His slides portrayed the safety program from the standpoint of plant inspection with the camera. Many safety rules and practices were violated and went unnoticed until a camera survey was instigated. He believes the safety engineer is overlooking a useful item if he neglects taking photographs. As he pointed out, being on the job with a camera keeps the man and supervisors on their toes. There was no repercussion from the personnel, rather an incentive to cooperate.

Officers

Officers of the Cement and Quarry Section were re-elected. M. C. M. Pollard, National Gypsum Co., Buffalo, N.Y., is general chairman; T. W. Jones, New Haven Trap Rock Co., New Haven, Conn., vice-chairman; Harvey F. Yotter, The General Crushed Stone Co., Easton, Penn., program chairman; Kent Jander, National Lime Association, Washington, D. C., secretary; and Gil G. Grieve, National Safety Council staff representative.

Eastern Agstone Meeting

THE AGRICULTURAL LIMESTONE DIVISION of the Pennsylvania Stone Producers Association held a meeting September 28, 1953, at Harrisburg, Penn., with approximately 50 members in attendance.

Leonard S. Fry, chairman, opened the meeting by telling the producers of the new 1954 P.M.A. Handbook, and then called on C. E. Cassel, chairman of the P.M.A. committee, for his comments on the new program. Mr. Cassel stated that the new administration was planning a long-range program, some of the plans being projected for six years in advance. He stressed the need for extreme care in the preparation of weight slips for bulk lime trucks as the Pennsylvania lime law requires an analysis sheet to accompany each delivery.

Mark Shuman, the new administrative officer of the state P.M.A. committee, followed with a brief analysis of the proposed operation of the 1954 program. He pointed out that the program was no longer considered a materials program, but rather a soils conservation package program whereby the farmer would be required to apply the full liming requirements, fertilizer requirements and seedings before the government would share in the cost of such a practice.

Chairman Fry then called on Herbert Albrecht, head of the Agricul-

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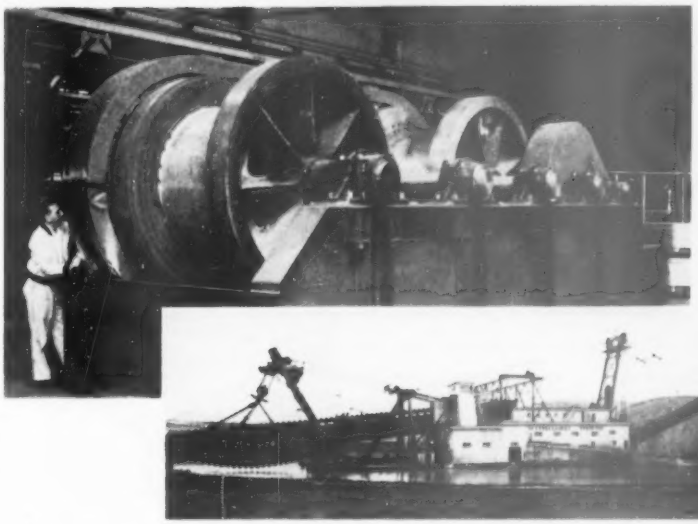

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This YUBA-built double-drum dredge hoist is designed to handle 194-foot digging ladder and is capable of lifting 800 to 1000 tons. Single-drum hoist (bottom) built by YUBA for tramway carries 5200 feet of wire rope. We're old hands at building such machinery. Every bucket ladder dredge Yuba has built combines many special "machines"—hoists, conveyors, drives, screening and metal saving equipment, winches, pumps —all designed and built by Yuba.

Experience and Facilities

YUBA's manufacturing experience includes grooved drums for large gate hoists, barges, steel and chemical plant equipment, construction rigs, clamshell buckets, ordnance, other custom work, and structural steel production. Parts for field assembly are fitted and match-marked before shipment to insure accuracy.

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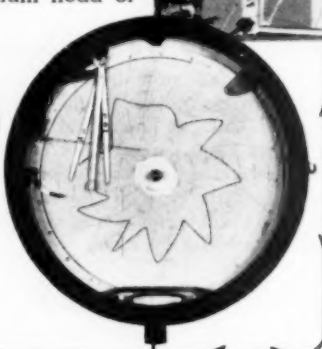
65

Don't lose your "head"!

. . . Let Foxboro control tank-water level at the pump

EVEN WHEN SUDDEN, EXCESSIVE DEMANDS HIT your water supply system, you can depend on the Rotax Altitude Controller to keep a safe head of water in the storage tank.

This weather-proof watchman operates right at the pump . . . eliminates tank-to-pump wiring. The Rotax Controller starts the pump when line pressure drops below pre-set limit — whether due to minimum head or high withdrawal rate. It stops the pump when tank is full . . . doesn't waste water in overflow. In addition, the instrument provides a continuous chart record of water level as an aid to efficiency checks.



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The Foxboro Company, 3011 Norfolk St., Foxboro, Mass.

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WON'T QUIT OR CAUSE TIME OUT

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KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

tural Extension Service, Pennsylvania State College, who stated that in view of the Extension's experience with soil testing in Columbia County the past two years, he believed the program could be made to work satisfactorily throughout the state. He said that regional meetings were held by the Extension throughout the state in order to stimulate the soils-testing program.

J. H. Eakin, assistant professor of agronomy, then followed with a discussion on the work which had been done in the soils-testing field by the college, and the plans which were being made for expanding this service. The morning session was then closed with a general question and answer period.

The afternoon session was primarily devoted to a discussion of the methods by which the industry could help promote soil testing to the farmers, as well as assisting the county P.M.A. committee and the county agent in getting the soil samples tested.

H. H. Wagner, executive secretary, reviewed the division's past experience in promoting the use of soil testing as well as a general advertising program. He suggested that each producer contact his local county agent and the county P.M.A. committee in order to determine what facilities were available and to what extent he could be helpful in promoting this important phase of the program. He also requested that each producer send him a report on the results of his activity.

A committee was then appointed to prepare educational literature which will be made available to liming materials producers and suppliers, at cost, for mailing to all of their customers. The committee will also prepare a leaflet with full instruction on the proper method of obtaining representative soil samples. The sampling instructions are to be mailed with the other educational literature. Members of the committee are David Shroyer, H. E. Millard Lime & Stone Co.; F. Edward George, Thomasville Stone & Lime Co.; J. Glen Hawthorne, Whiterock Quarries, Inc.; William O. Faylor, Faylor Lime & Stone Co.; and Secretary Wagner.

Phosphate Rock Production

THE BUREAU OF MINES has reported a record high of 12,000,000 tons of phosphate rock produced in 1952. Phosphate rock sold or used by producers rose 2 percent in 1952, with increases reported in Florida and Tennessee, and a drop of 7 percent in the western states. Total and average values were higher in 1952 than in 1951. The domestic consumption of phosphate rock also set a new record, rising more than 5 percent in 1952 above 1951, which is more than 144 percent above 1942. Producers' total stocks rose 30 percent in 1952 over the previous year.

dynamic new engine gives the popular D Motor Grader increased work power

The thousands who own Allis-Chalmers Model D's know the ability of these versatile machines to do outstanding work on both construction and maintenance jobs. Now — with extra power and added features — the Model D sets even higher performance standards in the low-cost grader field.

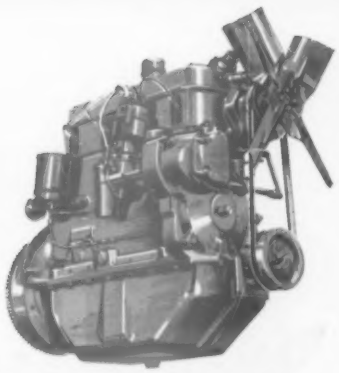
Dynamic New Power-Crater Engine gives the Model D reserve power to : (1) handle the same loads in higher gear or bigger loads in the same gear, (2) increase road speeds, especially where there are grades, (3) reduce need for shifting, thus lengthen clutch life, (4) give better all-round maneuverability. There's plenty of power to crowd while loading with the rear-end loader. Engine throttles down to half speed *and still does the same job* — on low-speed work.

Leaning front wheels* enable the Model D to handle new jobs . . . counteract side-draft on ditching and bank cutting.

Power circle turn* permits easy positioning of blade from operator's seat. When finishing subgrade or blacktop, for example, moldboard can be readily rotated without disturbing road surface.

These and other big-grader features — such as ground-gripping Tandem Drive, ROLL-AWAY Moldboard, Tubular Frame and Power Controls — combined with extra power make the Model D the accepted leader in the low-cost grader field. Ask your Allis-Chalmers dealer to demonstrate on your own job.

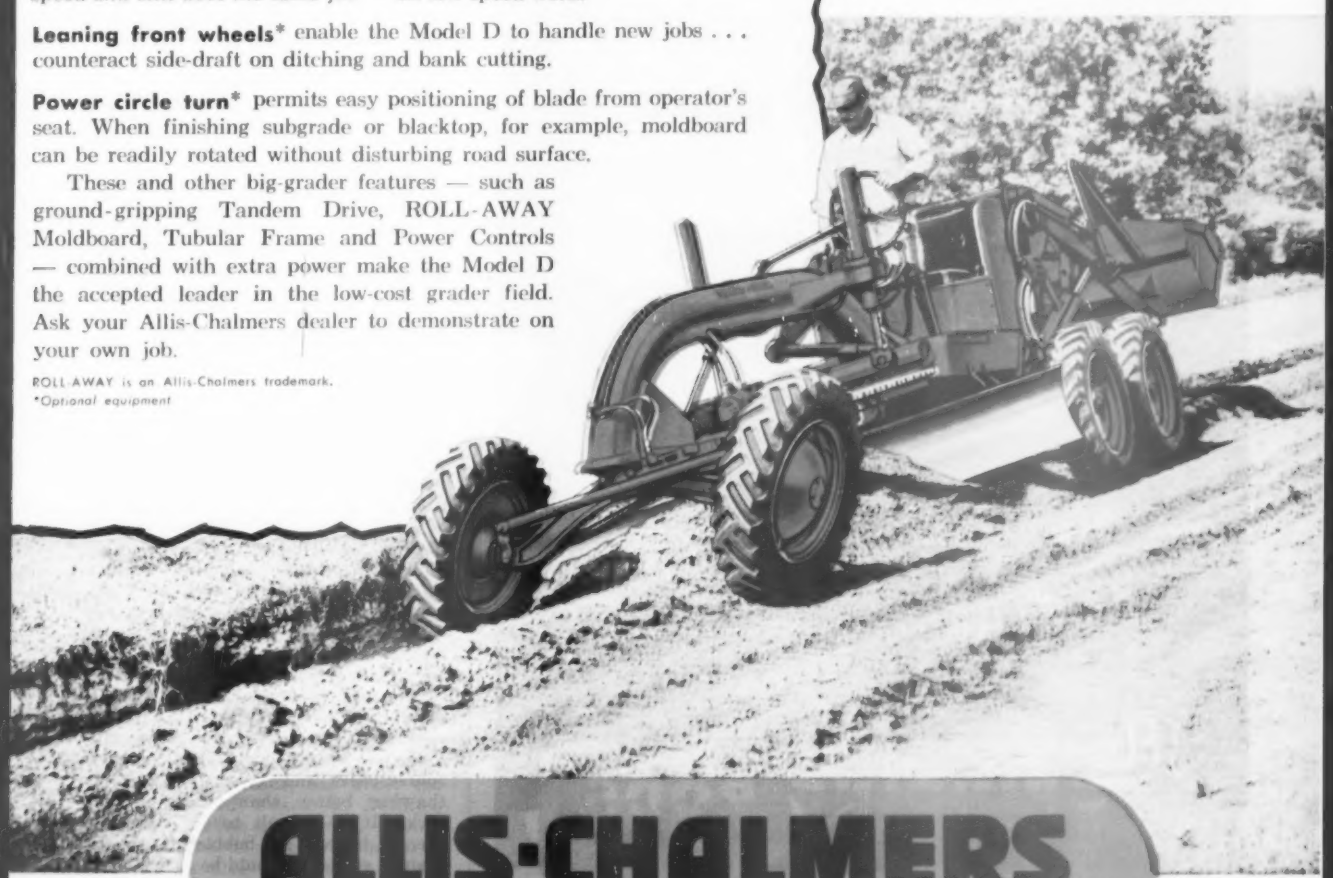
ROLL-AWAY is an Allis-Chalmers trademark.
*Optional equipment



POWER-CRATER Engine brings *truly modern* power to the Model D

This new engine boosts power while using less fuel per horsepower. It obtains high-octane performance when using regular gasoline. Only by watching a new Model D work can you fully realize what this truly modern engine adds to its performance!

Weight: 8,800 lb. (bare) • Brake Horsepower: 50
4 Speeds forward to 25.6 mph.
Reverse Speed 3.3 mph.



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CF&I grinding rods grind efficiently and economically. They are rolled from special analysis steels to wear evenly and resist abrasion. Strict quality control from ore to finished product means that CF&I grinding rods are tops in performance and value.

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Light Rails and Accessories

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GRINDING RODS
THE COLORADO FUEL AND IRON CORPORATION
DENVER • OAKLAND • NEW YORK

Rocky's Notes

(Continued from page 55)

with mixer on the job more of a competitor than heretofore.

We need say little about the falling off of automobile and agricultural machinery manufacture, because this has been widely publicized. It is merely another indication that there is a saturation point to spending, either because the public can absorb no more, or because it is beginning to realize that it is about time to clear up some of its indebtedness. Certainly there is nothing alarming in the picture; the change should be nothing more than a long needed and now very necessary readjustment. The thing for our readers to do, it seems to us, is to keep their feet on the ground and to lend all their efforts to promoting, or keeping alive, much needed public works and highway construction. The thing to guard against in such projects, as well as in their own industry purchases, is delaying action in anticipation of lower prices or costs. Delays in being ready when demand is there are often far more costly than paying prices a few percent more than they may be by waiting. It was the producer who went ahead and expanded his operations inspite of the *high post-war costs*, who has cashed in.

Air-Entrained Concrete

AT LEAST TWO of our friends, who we acknowledge have far more comprehension of the role of entrained air in concrete, say we are wrong in the statement in Rocky's Notes, September issue, that probably "the chief permanent advantage of air-entrained concrete, if not the only advantage, is that the use of air-entraining agents permits the use of less water with the same degree of workability." They insist that the discrete, minute air bubbles in the concrete serve a very definite function. Of course, both our readers and ourselves are familiar with the popularly accepted theory of that function in resistance to freezing and thawing tests.

Our thought, as expressed in what followed in the same discussion, was that any relatively large voids, or pores probably could serve the same purpose. We are told there is a vast difference between *entrained air* in discrete spheres of microscopic size and *entrapped air* in voids of relatively larger size. We drew our conclusion from the fact that natural rocks which have pores microscopic or larger in size are usually far more durable in freezing and thawing tests, than rocks so fine grained that the pore size is something less than microscopic in size. Also, we have the example of slag which is full of very coarse pores, and resists freezing and thawing better than most natural rocks. It is difficult to see why the special discrete air bubbles in air-entrained concrete should be so different from any other pores of relatively

large size (that is large in comparison with the kinds of voids in cement paste or silica gel). According to accepted theory they act merely as expansion chambers for moisture pushed into them from the surrounding matrix, if these pores are not spaced beyond a certain maximum distance. Much larger pores in rocks and slag apparently serve the same purpose—with the advantage of greater volume, provided they are not already filled with water. Most old, dry-mixed concrete, according to our friends, had entrapped air, not entrained air, unless grease leaked into the cement grinding mills!

N.C.R.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

ROCK PRODUCTS, published monthly at Chicago, Ill., for October 1, 1953.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Maclean-Hunter Publishing Corp., 309 W. Jackson Blvd., Chicago 6, Ill.

Editor—Bror Nordberg, 309 W. Jackson Blvd., Chicago 6, Ill.

Managing Editor—Ralph S. Torgerson.

Business Manager—P. D. Allen, 309 W. Jackson Blvd., Chicago 6, Ill.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

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3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.) . . .

P. D. Allen
Business Manager

Sworn to and subscribed before me this 22nd day of September, 1953

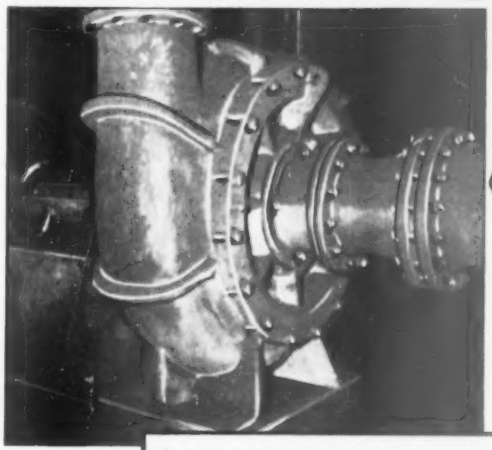
[SEAL]

Clara M. Brockschmidt
(My commission expires March 13, 1956.)

Opens Sales Office

NATIONAL GYPSUM CO., Buffalo, N.Y., recently opened a district sales office in New Orleans, La., under the managership of Frank B. Phillips, Jr. The new office will serve Louisiana and southern Mississippi, the area formerly handled by offices in Texas and Alabama.

Continuous Low-Wear Non-Clog Solids Pumping... At Lower Cost



Morris low-speed wide-clearance SOLIDS PUMP

Actual working installation of a low-speed, wide-clearance Morris Solids Pump which handles fine solids at a rate of 6,000 gpm at 52' total head. Pump speed only 370 rpm, 14" suction opening, 12" discharge.

Where total heads do not exceed about 120 feet, low-speed, wide-clearance Morris Type-M Solids Pumps will handle solids ranging from fine abrasives up to pieces 11" in diameter. The low-speed reduces the abrasive action of the smaller particles, the large clearance allows larger solids and "tramp" pieces to pass without trouble.

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Designed so that the most important wearing parts receive the least wear, initial high mechanical and hydraulic efficiencies are maintained throughout the longer service period of the pump. Double-thick wearing parts are sub-divided and protected so that the greatest erosion is taken by easily replaced segments. That means speedy, easy renewal, less down-time and lower maintenance cost.

Free Consultation

Morris engineers are always available to discuss and study your pumping problems with you. Describe your needs in a letter—or call your nearest Morris office. Our recommendations are free—entail no obligation. Write for Bulletin 175 which describes the Type M Solids Pump in detail.

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any sore that does not heal

...is the first of the seven commonest danger signals that *may* mean cancer...but should *always* mean a visit to your doctor.

The other six danger signals are– 2 A lump or thickening, in the breast or elsewhere 3 Unusual bleeding or discharge 4 Any change in a wart or mole 5 Persistent indigestion or difficulty in swallowing 6 Persistent hoarseness or cough 7 Any change in normal bowel habits.

For other facts about cancer that may some day save your life, phone the American Cancer Society office nearest you, or write to "Cancer"—in care of your local Post Office.

American Cancer Society

Lime Operating Meeting

(Continued from page 91)

MgO, and samples of stone from 28 quarries were studied. Complete detailed studies for all important properties were made of the samples including spectographic analysis for trace elements.

Each was burned under controlled conditions in platinum in a muffled furnace at four different temperatures and shrinkage of the lime was determined as a measure of fluxing in burning and degree of reactivity. Samples were slaked and insoluble residue was determined as a measure of impurities.

Prof. Murray presented some of the results. Where the presence of high impurities would be expected to be a less reactive lime, several of the samples of higher impurity actually showed an expansion, or high reactivity, when the lime was burned at 1750 deg. F.

The four temperatures used in the work are 1750 deg. F., 2050 deg. F., 2250 deg. F. and 2450 deg. F. Some samples showed expansion at 2050 deg. and none at 2250 deg. and 2450 deg. Whereas limes of high impurities would show expansion or very slight shrinkage at the lower temperatures, some of the purer samples showed fairly high shrinkages at all four temperatures. Results obtained were not as anticipated.

Some stones would have low shrinkage at any of the temperatures which would indicate they cannot be hard burned. Others showed high shrinkage at either temperature to a degree that indicated a mild-burned lime would be impossible to produce. Still others would have a high degree of shrinkage but only when the elevated temperatures are used, and the comparative shrinkage figures at the different burning temperatures indicated the need for extremely close burning control for some stones or the product characteristics would change markedly. Certain stones yielding a mild-burned, porous lime of low shrinkage would result in a hard-burned product if burning be pushed.

Prof. Murray's figures were proof that some lime specifications cannot be met with the stone available. Also, uniformity of the product varied widely in the case of some stones. A study of reproducibility of shrinkage data has been made. An example was a stone that was hand selected, washed and samples burned many times under controlled conditions. The shrinkage nevertheless ranged from 4.5 to 25 percent, indicating that the producer having that stone would have a very difficult problem in attempting to produce a uniform product. Variations were similarly found in correlating insoluble residue with the purity of stone.

As a result of these findings, Prof. Murray said that it would be unsafe for any producer to predict expected results on the strength of what neighboring producers are getting. No correlation between spectographic studies of stones and shrinkage has been found. He said that crystal structure must be studied, so that more might be known of the mechanism of the conversion of $CaCO_3$ to CaO. Greater shrinkage of the oolitic and lighter stone is apparent. Growth of CaO crystals in burning at the different temperatures will be studied.

Prof. Murray suggested that producers not expect to duplicate the results of others and that they not be afraid to undertake plant experimentation, because there is much to be learned. His talk came at an excellent time, during the session for the consumer panel, which gave these men an excellent opportunity to gain a better understanding of problems of the producer who must produce lime of special characteristics from stone that necessarily sets up limitations.

Next Meeting

The 1954 operating meeting is tentatively scheduled to be held in Milwaukee, Wis. The Ludington, Mich., lime plant of The Dow Chemical Co., will be included in the program for a visitation. Michael Brisch, Rockwell Lime Co., Manitowoc, Wis., has been appointed chairman of the operating division. Clarence Stielstra is program chairman for the 1954 meeting.

Cement Plant Production

NORTH STAR CEMENT CO. is operating at full capacity at its cement plant in Corner Brook, Newfoundland, shipping cement throughout Newfoundland, and to the principal Canadian cities east of Lake Huron. The plant is operating on 24-hr. production, working three shifts, seven days a week. At present speed and without major breakdowns, its production should be close to 100,000 tons per year. The company is considering the installation of an additional kiln, which would increase the yearly cement production by approximately another 100,000 tons. Also, due to rail shipping expenses, plans for the installation of elevators and a bagging mill are being considered, to permit cement shipment by water rather than overland. A. M. Reibling is plant manager.

Ecuador Cement Plant

A WEST GERMAN FIRM is building a cement plant in Ecuador which reportedly will be the largest industrial establishment in that country. All equipment will be supplied by the firm of MIAG in Western Germany, and the construction handled by an Ecuadoran firm under German management. Most of the capital is being furnished by the Ecuadoran government's Corp. del Fomento. Production is expected to begin by the end of 1954, and plant capacity will be 150 metric tons daily.

Barber-Greene

840 BITUMINOUS PAVING PLANT

B-G 840 Paving Plant, showing use of bulkhead feed with two-gate feeder for proportioning sand and gravel. 2, 3 or 4 aggregates may be blended in this manner.

PRACTICAL... PROFITABLE

UP TO 40 T. P. H.

The capacity range of this B-G Paving Plant has proved to be the most practical for a broad range of users. Output is high enough to supply materials for average-sized new construction and resurfacing jobs—investment is low enough to assure profitable operation at minimum capacities, or for intermittent operation.

ALL TYPES OF MIXES

Bituminous mixes of all types are produced at lowest cost with this B-G Plant. This includes the full range—all temperatures, all gradations and all binders. For "high-type" mixes, the aggregates are blended at the feeding end. Quality and uniformity are consistently high.

TRULY PORTABLE

Each basic unit of this plant—Mixer and Dryer-Dust Collector—is mounted complete on its own trailer-type pneumatic-tired chassis. Built-in hot and cold elevators and dryer stack fold down for transport. There is a minimum of dismantling—the plant can be moved and readied for work in new locations in a few hours' time.

EASIEST TO ERECT

No special erection equipment is needed to set up a B-G Paving Plant. No excavation or footings required. Units are spotted in place by truck, adjustable jacklegs are lowered to ground level, and the plant is ready for operation once the required auxiliary equipment is in place.

LOW-COST MAINTENANCE

The B-G Model 840 Paving Plant is easy to maintain. All moving parts are quickly accessible for inspection and adjustment. B-G Distributors offer fast emergency parts service, and are staffed with factory-trained experts to help you keep your B-G Paving Plant at top operating efficiency.

AUTOMATIC PROPORTIONING

Simple to understand and to operate, the B-G Paving Plant eliminates the human element in producing a consistently uniform mix. Once the bitumen and aggregate proportions have been set, they cannot vary as the positive displacement pump and aggregate apron feeder are positively interlocked. Proportioning is continuous, automatic and accurate.

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Sauerman earthmoving machines have been providing efficient, economical materials haulage in pits, quarries, and open strip mines for over forty years. Moderate in initial investment, they are equally adapted to a wide variety of applications, including stripping, reclamation, delivery to storage, and stockpiling.

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Unequalled for operations that require deep digging—especially under water—and conveying to a high delivery point. Reaches hundreds of feet into ponds, wet pits, sludge basins, etc. Lifts its load to the top of the plant thirty to forty times an hour.

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This is a long range aerial crane designed for all jobs of lifting, conveying and placing loads of unwieldy materials. It is used in quarries and open pit mines to lift and carry large chunks of stone and ore.

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Whatever your earthmoving problem may be, Sauerman has a size and type of machine to do the job. Write today for illustrated catalogs. Sauerman Bros., Inc., 530 S. Clinton Street, Chicago 7, Illinois

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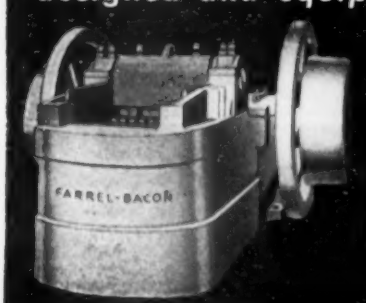

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ANSONIA, CONNECTICUT

BA-5

Vibrating Screens

(Continued from page 83)

therefore require proper maintenance and installation. When assembling bearings into the screen mechanism, caution must be used to obtain the proper fit for the inner race on the shaft and the outer race in the housing.

Field welding on screen bodies must be done by an experienced welder and care must be exercised to keep stresses produced by welding to a minimum. Preheat to approximately 150 deg. and use a low-hydrogen electrode.

Screen Balance

For various reasons, screens sometimes get out of balance. The four-bearing style screens are balanced by slackening off on the corner support springs until the entire body weight is carried through the shaft on the outer bearings. The adjustable weights on the flywheel are then moved to a position which will permit the shaft to rotate without coming to a stop at the same spot. The corner springs are then tightened.

Two-bearing, balanced-eccentric screens are balanced by adding, or subtracting from weights located in the balance wheel. When screen is at operating speed, it is in balance when the sheave ring on the drive balance wheel rotates on its center line.

No balancing of the mechanism is required on the low-head screen. However, the line of motion must pass through the screen body's center of gravity in order to secure a true straight line motion over the entire length of the screen. Therefore, weight added or subtracted from one end of the screen body must be compensated for at the other end.

When the natural frequency of a screen body approaches its operating speed, it is said to be running at a "critical speed." This is very evident by dead spots on the screen deck, erratic travel of the material over the deck, weaving of the screen side plates, or unequal amplitude of vibration on opposite corners of the same end of the screen. Operating screen at its critical speed may cause a reduction in capacity and failure of screen body side plate on each corner. With screen operating at full speed, hold a pencil at right angles to the side plate. Then, move pencil slowly from left to right in a horizontal plane to obtain a pattern of motion. Pivot a steady rest on the floor or other stationary member to prevent vertical movement of the pencil.

Critical speeds are caused by loose rivets or bolts, broken welds, overstressed members, incorrect suspension of the screen body, loose screening surfaces, etc. These points should be checked and corrected if critical speed is encountered. If the screen continues to operate in critical speed, change the operating speed upwards or downwards about 100 r.p.m.

Labor Relations Trends

(Continued from page 57)

two new members of the Board appointed by the new administration are still a minority at this writing, there is reason to believe that the viewpoint of the whole Board may be changed by its influence in handling future work with less bias. The new chairman, Guy Farmer, addressing a section of the American Bar Association, has promised that the coming months will see the Board "going through a period of readjustment when policies and principles will be subjected to scrutiny and reexamination by new members and old members alike." Announcement has already been made that the Board will discontinue the practice of assigning cases to three member panels, such as that which decided these Texas ready-mixed concrete cases. Thus the full Board will have an opportunity to act.

Among other views held by the new Board Chairman are that the use of authorization card checks to establish a union's majority in a refusal to bargain case, such as in these Texas instances, should be limited to extraordinary circumstances, as where the employer has, in an effort to avoid his obligations under the statute, engaged in unlawful conduct dissipating the union's membership and making it impossible to hold a free and uncoerced election. Except in such circumstances the union's majority status would have to be established through an election conducted by the Board. He also holds that an employer's questioning of employes in regard to their sentiments toward joining a union will not in all instances constitute unlawful interference with the employes' self-organizational rights. The previous members of the Board have held that all such questioning was per se unlawful.

Another opinion held by Chairman Farmer is that the jurisdiction of the N.L.R.B. should not be asserted over an employer with only a few employes, especially where the operation is in a state which has a labor relations act of its own. It is, of course, absurd on the face of it for the N.L.R.B. to spend thousands of dollars on a case which involves only 11 of a total of 18 employes, as in the Dallas Concrete Co. case. Mere matters of economy should rule out such extravagance with the taxpayers' money. However, it may be this changing attitude of the N.L.R.B. that is spurring Dave Beck to greater efforts for industry-wide bargaining. Some of the rest of the new philosophy of the Board was given in extracts of a speech by the other Eisenhower appointee in the article on this page in our October issue. By the time this is published it is expected a third new member will have been appointed, so that a majority (3) of the five-man Board will be ready to apply the changed viewpoint without serious opposition.

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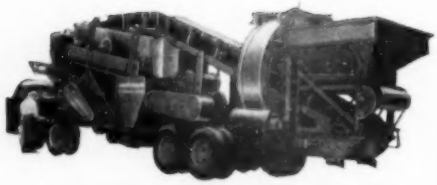

PORTABLE CRUSHING PLANT FOR AG-STONE AND ROAD ROCK

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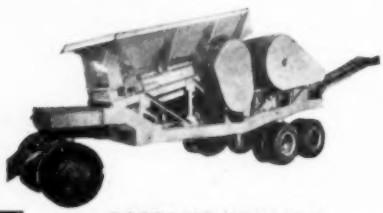

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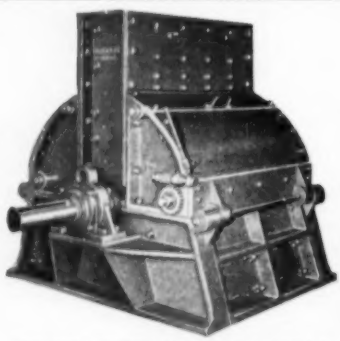

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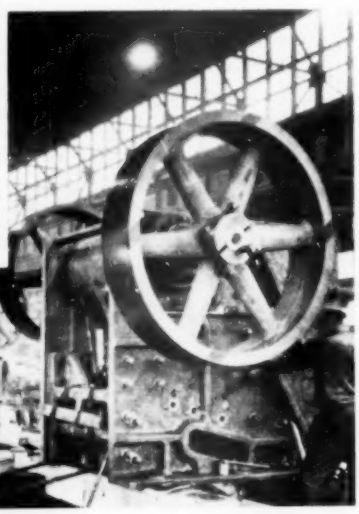

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Tailings Control

(Continued from page 78)

8½ ft. at a time. At the time of raising, the line is moved back away from the berm an additional 12½ ft., thus the slope of the outer face will be about in that ratio: 8½ ft. of rise to 12½ ft. horizontal.

By referring to Fig. 4 it will be noted that it is not necessary to raise the entire line; merely hook onto the end of the next higher line where it dumps into the 8½-ft. drop-box.

To raise the line, the work starts progressively from the more distant end and progresses towards the entry drop-box. The old line is broken upstream from the drop-box and turned in toward the pond with a temporary launder. This section of the line carries the tailings until the downstream section is raised. The two sections are tied together during a short 2-hr. period when the mine and mill pumps are down and the line is empty. The bents used to raise the line have 4-x 4-in. legs with no cross braces. Two 2 x 8's form the top horizontal section and one of these 2 x 8's extends outwards a few feet (on the inside of the pond area) to support a walkway. The base of each bent is two 2 x 10's about 16 ft. long and bolted together with 4-in. spacers. They are mounted on edge. One end of this 16-ft. segment rests on the top of the older buried pipe supports with the end near the pond section resting on mud boards. The vertical members are braced about every fourth bent in a longitudinal direction to prevent the line from moving or tilting endways. As the wood supports will be buried in the dike and therefore lost, economy in the use of lumber is practiced. (See Fig. 5.) The wood sections of pipe are connected at junctions by wood block couplings and steel bands. The pipe is light enough for two men to handle.

During earlier operations at Gilman a tailing pond was used that is closer to the millsite. This was an oval-shaped area with dam across the lower end. Clear effluent was drawn off through one decant pipe early in the pond life, through a weir toward the end of the pond life. The pulp was introduced at one end of the pond and the weir was at the other, or dam end. This meant there were no coarse sands available near the dam with which to build up the dike so a 2-in. pump had to be installed. This picked up some of the higher density pulp and placed it near the dam. In the long run, this proved unsatisfactory, so the pond was abandoned and the newer one started below. However, the old pond is kept in such shape that it can be used in an emergency.

Near the tailing pond is a freshwater lake owned by the company. The lake is stocked with trout. A recreational ground is provided for the use of the employes. Children of em-

(Continued on page 122)

The machine that has revolutionized BLAST HOLE DRILLING

The JOY CHAMPION

There are no water lines to worry about with a Joy Champion. As the tri-cone bit cuts, a blast of air blows the cuttings to the surface and into a bag-type dust collector.

W&D 4630

The Joy Champion Blast Hole Drill is a continuous-type rotary drill that DRILLS DRY—you can forget water lines and all their Winter freezing problems.

Drilling is by a tri-cone roller bit which pressure-cuts the rock while a cooling air blast is forced down the drill pipe and through the bit. Cuttings are blown to the surface where they are captured—with 100% efficiency—by a new, optional, bag-type dust collector.

The Joy Champion drills straight, smooth-walled, easily loaded holes, from 5⅝″ to 7⅞″ dia. to any normal depth required. It trams at 5 mph and sets up quickly with 3-point hydraulic leveling. The two models—Mediumweight and Heavyweight—can be furnished with either electric motor or diesel drive. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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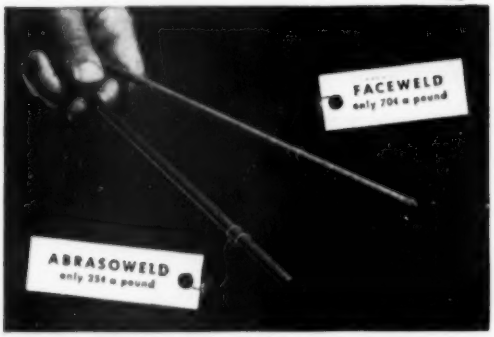
SINCE 1851—OVER A HUNDRED YEARS OF ENGINEERING LEADERSHIP



DON'T BUY HARDSURFACING JUST BECAUSE IT'S HIGH PRICED

THERE'S a notion that a hardsurfacing electrode must be high priced to give proper service. This is not true and here's why:

By proper combination of alloy materials plus efficient, mass manufacturing, Lincoln hardsurfacing electrodes, costing one third as much money, produce equal and more often superior resistance to impact and abrasion.

1. Lincoln "Abrasoweld" sells for 25 cents a pound. This is only about one third the cost of other hardsurfacing electrodes.

2. Lincoln "Faceweld" sells for 60 to 70 cents a pound . . . comparable rods cost $2.60 a pound.

Remember, in spite of these low prices, *you still get high alloy content* in Lincoln hardsurfacing . . . top resistance to impact and abrasion, which means low end-of-service cost. So why pay the high prices?

MAKE YOUR OWN COMPARISON. Try a sample order of "Abrasoweld" and "Faceweld". Your own jobs will prove that hardsurfacing costs can be cut 30 to 50 per cent!

A Hardsurfacing Expert is available in every Lincoln District Office. Ask for him to help solve your problem.

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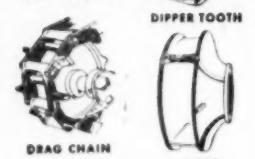

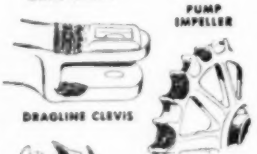

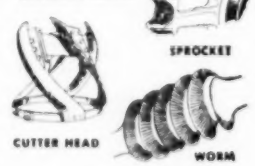

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centrifugal PUMPS

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

ployes of The New Jersey Zinc Co. are transported to the recreational area in buses. The children are in the care of a competent lady supervisor. The recreational area includes a ball park equipped for night games, rodeo grounds, tennis courts, merry-go-rounds, slides and miscellaneous playground equipment. Paved roads thread through the recreational area. During the winter months the company provides a nursery school.

The main offices of The New Jersey Zinc Co. are in New York City, N.Y. S. S. Goodwin is vice-president in charge of production. W. L. Jude is superintendent at Gilman, and Gordon Craig is mill superintendent.

Rotary Kiln Loading

(Continued from page 80)

ed in the article in ROCK PRODUCTS, August, 1953, page 128, extends five diameters up the kiln for any normal loading. For a model of 9-in. diameter, the effect is 45 in. long which is almost the full length of two 24-in. sections. It is for such a reason that it is often necessary to use a model of considerable length.

We do not attempt to follow the scale exactly as to length. For example, if we wanted to explore the effect of a 25-ft. length of tile, it should have a length in the model of:

$$25 \text{ ft.} \times 12 \text{ in.} \div 10.67 = 28 \text{ in.}$$

We would consider the 24 in. of one section as being sufficient.

However, when there is a backing up problem, we work to scale in the length. If we wanted some interior preheater construction near the feed end, we would fabricate it in thin sheet metal quite exactly, and make the length of the cylindrical feed section to scale to determine the effect on the feed, and the possibility of overflowing the feed end nose ring by a backing up action.

This model can be used to study the performance of any rotating cylinder. We have used it to help in the interior design of our Unax type lime coolers.

The basic design of this model kiln and the methods and mathematics of use, were devised by Prof. J. A. Murray of the Massachusetts Institute of Technology, who was the former research chief of The Warner Co.

Perlite Plant Sold

BUFFALO PERLITE CORP., Buffalo, N.Y., has been sold by Fred Seitz to Joseph Pfahl, co-owner of Pfahl Bros., Inc., a sand and gravel company; Leo A. Roth, general contractor; Edward M. Roth; and Howard Mason, who has been production and sales manager for Buffalo Perlite since its founding three years ago. The company produces plaster and concrete aggregate building materials. Joseph Pfahl is the new president, Leo Roth, vice-president, Edward Roth, treasurer, and Howard Mason, secretary and general manager.

Director's Meetings

(Continued from page 104)

mately 8 percent (in other words, for similar batches of concrete mixed in the laboratory day after day, only one strength test in 10 should be expected to fall below 90 percent and only one test in 100 below 81 percent of the average). It is proposed to continue the series of tests for various other factors.

Other research in progress includes tests of various admixtures, with particular attention to the effects of handling test specimens. Future work contemplates extensive testing of fly ash. The Manual on Ready-Mixed Concrete is proving to be a very popular publication and has gone through a second printing of 5000 copies.

New business included a suggestion for enlarging the Board of Directors from 18 to 24 members, which will be acted upon at the next annual convention. Stephen Stepanian of Columbus, Ohio, the actual inventor of the concrete truck-mixer, was honored by election as an honorary member of the Board, as mentioned in more detail in the Personal columns of this issue.

Sand and Gravel Board

The Board of Directors of the National Sand and Gravel Association met on Tuesday morning. President Albert R. Shiely, St. Paul, Minn., merely referred to the address he had already made at the joint meeting of the two Boards. The financial report which followed showed remarkable progress and a healthy growth. Probably none of the old-timers present ever dreamed of the present size and influence of the Association. Since the San Francisco convention, 15 new active members have joined and 7 new associate (machinery) members. Together with the National Ready-Mixed Concrete Association (and very probably the National Industrial Sand Association) a generous retirement plan for staff members of the two Associations has been established. It will be under the direction of the John Hancock Insurance Co. of Boston, and a board of trustees selected by the Association. It is based on premiums paid wholly by the Association. Pensions are earned after five years of employment, at the age of 65, and will equal three-fourths of 1 percent of the employe's compensation at the date he becomes a member, for each year of service prior to such date, with a limit of 20 years. In other words, having served 20 years a staff member is entitled to 20 percent of the salary he is earning as a pension. Thereafter the pension increases 1 percent for each year up to normal retirement age—which is 65, but an employe can continue, under special conditions, to work up to the age of 70. There are other provisions including opportunity for individuals to take out life insurance at reduced rates.

(Continued on page 124)

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HANDLING GRAVEL

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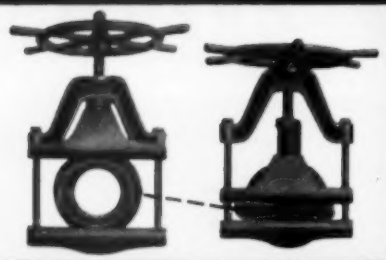

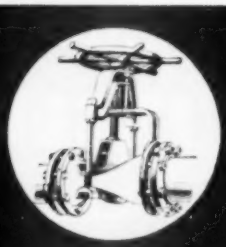

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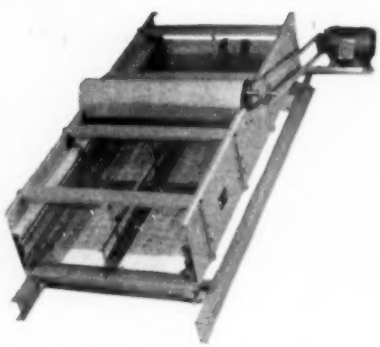

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J. Rutledge Hill, Dallas, Texas, chairman of the special committee on percentage depletion, warned the Board (and the industry) that it must be prepared to fight to keep the present percentage depletion allowance on income tax returns; and he is tireless in his advocacy of a 15 percent allowance in place of the present 5 percent. Both he and Secretary Ahearn believe there will be some agitation in Congress to do away with the percentage depletion allowance, for which all the mineral industry contended for several years.

Engineering Work

As usual, Stanton Walker, director of engineering, reviewed engineering matters of special interest to the industry. This included remarks about possible subjects to be discussed at the convention sessions on operating problems. The Association laboratory at the University of Maryland is engaged in a major study of bituminous pavement mixtures for sand and gravel aggregates. Included in this study are questions of merchandising material of sizes which accumulate to excess at some operations. Mr. Walker contemplates a short course on bituminous mixtures at the University, similar to the one now conducted on portland cement concrete. He reviewed changes in specifications for aggregates as recently written, and finds some architects attempting to apply A.S.T.M.'s new tentative specification designed to cover cement-alkali-aggregate reaction without really knowing anything about it. Also, the more or less discredited ideas about the incompatibility of aggregates (mineralogically) are getting into some specifications. Mr. Walker said specifications are becoming quite stabilized on required minimum percentages of minus No. 50 and No. 100 mesh sizes. As to railway ballast, specifications have undergone many changes in the last few years, with the changing ideas of railway maintenance men on the functions of ballast.

Attendance

The Board meetings were very well attended by nearly all the active directors. Only the absence of several of the past-presidents prevented making a full roster. Following is the complete attendance, including several guests:

Lockard J. Allen, Landers-Norblom-Christenson Co., Minneapolis, Minn.
Mr. and Mrs. Frank Andersen, Andersen Sand & Gravel Co., Saginaw, Mich.
Robert H. Baker, Dixie Sand & Gravel Corp., Chattanooga, Tenn.
Mr. and Mrs. C. A. Barinowski, Montgomery-Roquemore Gravel Co., Montgomery, Ala.
Mr. and Mrs. R. S. Barneyback, Henry J. Kaiser Co., Oakland, Calif.
Mr. and Mrs. George Bathe, Ready Mixed Concrete Co., Omaha, Nebr.
Mr. and Mrs. Fred Bellamy, daughter, Linda, Concrete Materials Co., Waterloo, Iowa
Mr. and Mrs. Harry E. Bender, Azusa Rock & Sand Co., Azusa, Calif.
Mr. and Mrs. Theodore M. Bowers, Ohio Valley Sand Co., New Martinsville, W. Va.
Mr. and Mrs. Charles E. Brady, Material Sales Co., Salisbury, N. C.
Mr. and Mrs. E. F. Brovelli, Basalt Rock Co., Inc., Napa, Calif.
Mr. and Mrs. Joseph A. Bullen, Fountain Sand & Gravel Co., Pueblo, Colo.

Mr. and Mrs. Morgan R. Butler, Butler Bin Co., Waukesha, Wis.
Mr. and Mrs. C. A. Chipley, Fordyce Gravel Co., San Antonio, Texas
Mr. and Mrs. Robert C. Collins, Warner Co., Philadelphia, Penn.
Mr. and Mrs. Otto S. Conrades, St. Louis Material & Supply Co., St. Louis, Mo.
Mr. and Mrs. C. G. Cooley, Cooley Gravel Co., Denver, Colo.
Mr. and Mrs. L. M. Cooley, Cooley Gravel Co., Denver, Colo.
Mr. and Mrs. Fred P. Curtis, Lyman Richey Sand & Gravel Corp., Omaha, Nebr.
Mr. and Mrs. E. K. Davison, daughter, Willa Jean, E. K. Davison Bros., Pittsburgh, Penn.
Mr. and Mrs. William W. Duncan, Clark Certified Concrete Co., Inc., Baltimore, Md.
Mr. and Mrs. Arthur J. Egan, Ready Mixed Concrete Co., Minneapolis, Minn.
Mr. and Mrs. Alexander Foster, Jr., Warner Co., Philadelphia, Penn.
George J. Fredericks, Koenig Coal & Supply Co., Detroit, Mich.
Mr. and Mrs. Norman J. Fredericks, Koenig Coal & Supply Co., Detroit, Mich.
Mr. and Mrs. Phil Gemmer, Texas Construction Material Co., Houston, Texas
Mr. and Mrs. E. Alvin Goodman, Jr., lessees of B. V. Hedrick Gravel & Sand Co., Lilesville, N. C.
Mr. and Mrs. Emory M. Heuston, Bucyrus-Erie Co., South Milwaukee, Wis.
Mr. and Mrs. Wm. J. Hicklin, Jr., Capitol Concrete Co., Jacksonville, Fla.
Mr. and Mrs. J. Rutledge Hill, Gifford-Hill & Co., Inc., Dallas, Texas
Mr. and Mrs. Richard K. Humphries, Pacific Coast Aggregates, Inc., San Francisco, Calif.
Mr. and Mrs. Herbert Jahncke, Jahncke Service, Inc., New Orleans, La.
Mr. and Mrs. Howard W. Jordan, Metropolitan Sand & Gravel Co., Port Washington, N.Y.
Mr. and Mrs. Ralph Johnson, Simplicity Engineering Co., Durand, Mich.
Mr. and Mrs. Walter M. Keeler, The Walt Keeler Co., Inc., Wichita, Kan.
Richard D. Ketner, General Electric Co., Schenectady, N.Y.
Mr. and Mrs. Ezra C. Knowlton, Utah Sand & Gravel Products Corp., Salt Lake City, Utah
Mr. and Mrs. George R. Krom, The Windsor Building Supplies Co., Newburgh, N.Y.
C. H. Latham, The Lynn Sand & Stone Co., Swampscott, Mass.
Mr. and Mrs. W. E. McCourt, Greenville Gravel Co., Greenville, Miss.
Mr. and Mrs. James F. McCracken, American Builders Supply Co., Louisville, Ky.
Mr. and Mrs. Otis H. Manchester, Jr., Concrete Transport Mixer Co., St. Louis, Mo.
Charles E. Marshall, Fort Worth Sand & Gravel Co., Forth Worth, Texas
Mr. and Mrs. Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif.
Mr. and Mrs. Thomas E. Montgomery (guest of R. C. Collins), Wynnewood, Penn.
Mr. and Mrs. John W. Murphy, Union Sand & Gravel Co., Spokane, Wash.
Mr. and Mrs. Charles P. O'Leary, Terre Haute Concrete Supply Corp., Terre Haute, Ind.
Mr. and Mrs. T. E. Popplewell, Forth Worth Sand & Gravel Co., Fort Worth, Texas
Mr. and Mrs. Robert F. Porter, Harry P. Campbell Sons' Corp., Towson, Md.
Mr. and Mrs. George W. Renwick, Chicago Gravel Co., Chicago, Ill.
Mr. and Mrs. H. Irving Rhine, Bode Gravel Co., San Francisco, Calif.
Mr. and Mrs. John W. Roberts, Southern Materials Co., Inc., Richmond, Va.
Nathan C. Rockwood, ROCK PRODUCTS, Chicago, Ill.
Mr. and Mrs. Ralph B. Rogers, Fort Worth Sand & Gravel Co., Fort Worth, Texas
Mr. and Mrs. Floyd G. Rubey, Dubuque Ready Mix Concrete, Dubuque, Iowa
Mr. and Mrs. R. E. Sallee, South Texas Materials Co., Corpus Christi, Texas
Mr. and Mrs. Louis C. Schilling, I. E. Schilling, Miami, Fla.
Mr. and Mrs. F. E. Schouweiler and Mrs. Mary Gill, Old Fort Supply Co., Inc., Fort Wayne, Ind.
Mr. and Mrs. H. E. Shelby, Concrete Supply Co., Charlotte, N. C.
Mr. and Mrs. Albert R. Shiely, J. L. Shiely Co., St. Paul, Minn.
Mr. and Mrs. Joseph L. Shiely, J. L. Shiely Co., St. Paul, Minn.
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Mr. and Mrs. Alfred H. Smith, daughter, Marelyn, Alfred H. Smith, Upper Marlboro, Md.
Mr. and Mrs. Frank P. Spratlen, Jr., Ready Mixed Concrete Co., Denver, Colo.
Mr. and Mrs. Eugene Sundt, Albuquerque Gravel Products Co., Albuquerque, N. M.
Walter E. Trauffer, **Pit and Quarry**, Chicago, Ill.
Mr. and Mrs. R. E. Weaver, The Lincoln Sand & Gravel Co., Lincoln, Ill.
Vincent P. Ahearn, National Associations, Washington 4, D. C.
Mr. and Mrs. Stanton Walker, National Associations, Washington 4, D. C.

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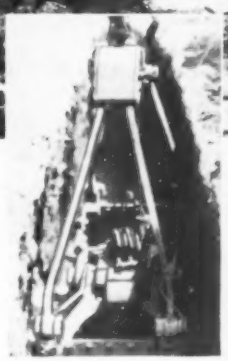

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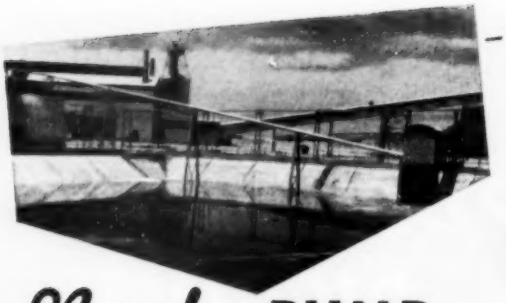
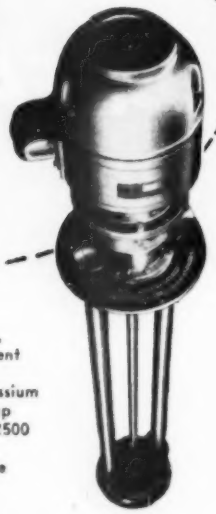


Nagle PUMP

EARNS ITS SALT AT SOUTHWEST POTASH CO.

A Nagle 10" Type "SW-B" frame 238X vertical shaft pump, with manganese steel water end parts, is giving excellent service at the Southwest Potash Co., Carlsbad, New Mexico, handling a slurry of sodium chloride and potassium chloride. Solids vary from a few percent up to 50%. Pump is 23' 6" long. Variable operating conditions call for 2500 g.p.m. at 60' of head and 5000 g.p.m. at 57' of head. If yours is a tough or abusive pumping job it calls for Nagle Pumps. Send for copy of "Nagle Pump Selector."



NAGLE PUMPS

NAGLE PUMPS, INC.

1269 CENTER AVENUE, CHICAGO HEIGHTS, ILLINOIS

PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

MANUFACTURERS NEWS

Koehring Co., Milwaukee, Wis., has announced the appointment of E. A. Smith as vice-president and manager of Koehring Inter-American Co. and Koehring Overseas Co. He replaces R. E. Stewart, who has resigned. Mr. Smith was formerly a sales engineer for C. S. Johnson Co., Champaign, Ill., a Koehring subsidiary.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that Dwight H. Lory, former assistant to the general manager of the Norwood plants, has been named assistant manager of the Texrope drive section, Plant No. 2, Cincinnati, Ohio.

Columbia Machine Works, Vancouver, Wash., announces that George Riem, who has been general superintendent of the factory at Vancouver for 15 years, has been named manager of a new factory branch at Mukwanago, Wis.

Koppers Co., Inc., Pittsburgh, Penn., has appointed Leo A. Kramer as district sales engineer in the Freyn engineering and construction division, Chicago, Ill.

Clark Equipment Co., Buchanan, Mich., has appointd the Crunkleton Co., Charleston, W. Va., as distributor in the West Virginia counties south of and including Pleasant.

Not a clog in a carload . . .

That's right . . . the full clearance of Hendrick Perforated Metal assures the screening of large quantities of materials without time-wasting blinding. Hendrick Perforated metal maintains uniformity of mesh through a sustained life of service. Decks can be changed rapidly saving valuable time and effort. Supplied either flat or corrugated, Hendrick Perforated Metal is available in any desired shape and size of openings in high carbon, stainless steels and in other commercially rolled metals.

Write for more complete information — or phone Hendrick direct!

Hendrick

MANUFACTURING COMPANY

47 DUNDAFF STREET, CARBONDALE, PA.

Sales Offices in Principal Cities

SEE OUR CATALOG IN SWEET'S

Perforated Metals • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

Tuffy®

Saves Up to 40% on Sling Costs

"Tuffy Slings Are Easy To Work With"

Says Superintendent of a Missouri Construction Company (Name on Request)

Only Tuffy Slings give you the patented 9 part machine-braided wire fabric construction that resists knots and kinks . . . stands up longer than ordinary wire rope. Tuffy Slings can be repeatedly bent around small radii and abrupt corners. You'll find Tuffy Slings are extra flexible, extra strong — they're proof tested to *twice* the safe working load. Try Tuffy yourself and see the difference!

Write For FREE Sling Handbook Mail Coupon Today!

UNION WIRE ROPE CORP.
Specialists in Wire Rope and Braided Wire Fabric
2156 Manchester Ave., Kansas City 3, Mo.

Please send me the FREE Tuffy Sling Handbook and Rigger's Manual.

Firm Name_____

By _____ Title _____

Address_____

City_____ Zone ___ State _____

C-20

Ritchie, Gilmer, Braxton, Webster and Pocahontas; Ohio counties of Washington, Meigs, Gallia and Lawrence; and Kentucky counties of Lewis, Greenup, Carter, Rowan, Boyd, Morgan, Elliott, Lawrence, Mogoffin, Johnson, Martin, Floyd and Pike.

St. Regis Paper Co., New York, N.Y., announces award of two undergraduate scholarships in forestry to William Echols Ball, Jr., University of Washington, and Donald Thomas Lester, University of Maine. Each scholarship amounts to $800 a year for two years and are awarded to outstanding Junior students at the University of Washington, University of Maine, Alabama Polytechnic Institute, University of Florida, and the University of Georgia.

Borg-Warner Corp., Chicago, Ill., announces the election of Harry P. Troendly as president of the spring division. He succeeds David E. Gamble, who has retired. Mr. Troendly has been vice-president and general manager of the division since 1940. M. O. Gillette, factory manager, and Arthur J. Welch, sales manager of the spring division, have been appointed vice-presidents.

Harnischfeger Corp., Chicago, Ill., announces the appointment of J. F. Catalane as sales manager of the P&H small excavator division. He succeeds F. C. Edwards, who was recently appointed general manager of the P&H diesel division. Robert P. Jones has been appointed assistant sales manager of the small excavator division.

Bucyrus-Erie Co., South Milwaukee, Wis., has announced availability of a 16 mm. sound-color motion picture, "Digging For Your Future." The film shows interior views of the plants in South Milwaukee, Wis., Erie, Penn., and Evansville, Ind., also typical applications of excavators, shovels, draglines, cranes, tractors and drills.

General Electric Co., Plainville, Conn., has announced the appointment of R. C. Wilson as manager of engineering in the distribution assemblies department. T. D. MacLafferty has been named manager of marketing; Charles K. Skinner, manager of manufacturing; and R. J. Blair, manager of finance.

Gar Wood Industries, Wayne, Mich., announces that H. N. Nelson, assistant sales manager, Findlay division, was killed September 29 in an automobile accident in Moorhead, Minn. He was 43 years old.

Joseph T. Ryerson & Son, Inc., Chicago, Ill., announces construction of a large addition to its New York area steel service plant in Jersey City, N. J.

United States Rubber Co., New York, N.Y., has announced the election of John E. Caskey as a vice-

Tuffy® Increases DOZER ROPE Service 3 Ways!

Specially Created DOZER ROPE Reel Mounted On Your Dozer

Here's how you save 3 ways. 1st, order ½ inch Tuffy Dozer Rope on 150' reels. It is specially constructed to last longer in tough dozer service. 2nd, mount the full reel on your dozer. Feed just enough Tuffy Dozer Rope through the wedge socket to replace the few feet that gets the wear on the drum. Keep on using the undamaged part. 3rd, repeat this procedure — avoid throwing away 40 or 50 ft. of Tuffy Dozer Rope while there still is a lot of service left in it . . . cut your down time in half . . . get longer service from Tuffy, the dozer rope specially constructed for dozer service. Users report savings up to 300%.

Mail Coupon For More Information on Tuffy Dozer Rope

UNION WIRE ROPE CORP.
Specialists in Wire Rope and Braided Wire Fabric
2156 Manchester Ave., Kansas City 3, Mo.

Please send me the FREE illustrated folder on Tuffy Dozer Rope.

Firm Name_____

By _____ Title _____

Address_____

City_____ Zone ___ State _____

C-19

ALLIGATOR
V-BELT DRIVES
. . . you can make up all lengths of V-Belts quickly

★ **Units contain V-Belting, Fasteners and Tools** — everything you need in one package for all emergencies when correct endless V-belt is not available.

★ **Avoid costly delays,** shut-downs and pickups.

★ **Eliminates costly dismantling** of machinery when re-belting.

★ **Completely modern make-up units** that give you peace of mind as well as stock on hand.

★ **Less Stretch and Follow-Up Maintenance.** Just One Strong Joint.

★ **Alligator V-Belt Drive Units,** available in sizes A, B, C and D. B size furnished in display box.

★ **Order from your distributor. Ask for Bulletin V-215.**

FLEXIBLE STEEL LACING CO.

4684 Lexington St. Chicago 44, Ill.

president of the company and general manager of the Naugatuck chemical division. He succeeds John P. Coe who will handle the company's interests in the transfer of synthetic rubber plants from the government to private industry. George R. Vila, formerly general sales manager of Naugatuck chemical division, has been made assistant general manager of the division.

The Timken Roller Bearing Co., Canton, Ohio, announces that activities of the Milwaukee industrial sales division has been divided among the district offices in Milwaukee, Minneapolis and Moline. Robert Morgan continues as district manager at Moline. Floyd Harshorn is district manager in Milwaukee, and Donald Van Orman is district manager in Minneapolis.

Westinghouse Electric Corp., Pittsburgh, Penn., announces that Robin S. Kersh, vice-president and manager of the northeastern region, was recently given the company's Order of Merit for distinguished service. Mr. Kersh joined Westinghouse in 1929. He is also executive vice-president of Westinghouse Electric International Co.

Flexible Steel Lacing Co., Chicago, Ill., has announced the election of Milton B. Beach as president and general manager, and John P. Ramsey as vice-president and sales manager. Phillip Rinaldo continues as treasurer, and Hugh L. Coats as secretary. Mr. Beach has been a member of the company for 35 years, 22 of which he served as vice-president.

Chain Belt Co., Milwaukee, Wis., announces the appointment of Robert G. Kuhnmuench as western district manager in the Los Angeles, Calif., office of the construction machinery division. He was formerly eastern district manager and will be succeeded by Richard Seaman, who has been assistant to the sales manager.

Barber-Greene Co., Aurora, Ill., has released a 16 mm. sound-color film entitled "Conveyors Only Look Alike," describing the company's complete line of portable belt conveyors and showing the equipment handling sand, gravel, crushed stone, ore, coal, etc.

Bemis Bro. Bag Co., St. Louis, Mo., announces the death on October 19 of Arthur C. Ewer, manager of the Brooklyn plant. He had been with the company for 53 years.

Blaw-Knox Co., Pittsburgh, Penn., has elected William Rodgers as vice-president and general sales manager. He is also a director of the Granite City Steel Co.

The Torrington Co., Torrington, Conn., has announced the appointment of Walter C. Thomson as executive vice-president to succeed Alfred W. Burg, who has retired after 37 years of service. He was fomerly vice-president in charge of sales and will be succeeded by Ray B. Nichols, who continues as president and general manager of The Torrington Co. of Indiana, a subsidiary. Rodney T. Dunlap has been named vice-president and general manager of the division; John A. Toth, assistant general manager, and Walter Fisher chief engineer.

Symons Clamp & Mfg. Co., Chicago, Ill., announces that Vernon L. Mock, Oklahoma City, Okla., will represent the company in the state of Louisiana in addition to Texas, Arkansas and Oklahoma. William Nailen, Birmingham, Ala., sales representative in North Carolina, South Carolina, Alabama, Georgia and Tennessee, will also handle sales in the state of Mississippi.

Penn Crete Products Co., Philadelphia, Penn., has announced the opening of its new Plant No. 2 in Frankford, Penn. An affiliate, Penn Crete Paint Co., with headquarters at Plant No. 2, has been formed to manufacture waterproofed cement paint and masonry coatings. Herman Kirshbaum is president and founder of the company.

Atlas Powder Co., Wilmington, Del., has announced the appointment of Albert W. Strahorn as assistant chief engineer. He was formerly manager of the Giant explosives works at Richmond, Calif., and will be succeeded by Henry T. Clark, formerly director of the Volunteer Ordnance Works at Chattanooga, Tenn.

Colorado Fuel & Iron Corp., New York, N.Y., has appointed Forest S. Burtch as product sales manager of the construction materials department of John A. Roebling's Sons Corp., a subsidiary. Elmer A. Trask has been named to succeed Mr. Burtch as wire rope sales manager.

Fruehauf Trailer Co., Detroit, Mich., has announced the appointment of Warren Lee Pierson as a member of the board of directors. He is also chairman of the board and chairman of the executive committee of Trans World Airlines.

Link-Belt Speeder Corp., Chicago, Ill., announces that Gordon W. Rowand has been appointed assistant sales manager, with headquarters at Cedar Rapids, Iowa. He was formerly district representative in Illinois, Michigan and Indiana.

Caterpillar Tractor Co., Peoria, Ill., has named Roger T. Kelly as labor relations manager of the Peoria plant. He was formerly industrial relations manager of the Trackson Co., Milwaukee subsidiary, and will be succeeded by Robert L. Sutton.

Air Reduction Co., Inc., New York, N.Y., announces that Howard H. Foster has been elected treasurer to succeed William Winters, Jr., who has retired.

GREATER TONNAGES OF BETTER QUALITY AGGREGATE AT LOWER COST PER TON

UNIVERSAL'S

IMPACT MASTER

WITH

CONTROLLED IMPACT ACTION

GIVES YOU THESE
PROFITABLE ADVANTAGES

1 GREATER CONTROL OF AGGREGATE SIZE

The reduction is done by the rotor hammers. The speed of the rotors governs the reduction — the greater the speed, the greater the reduction. Three adjustments control percentage of sizes within limits of the finished product.

2 GREATER RATIO OF REDUCTION

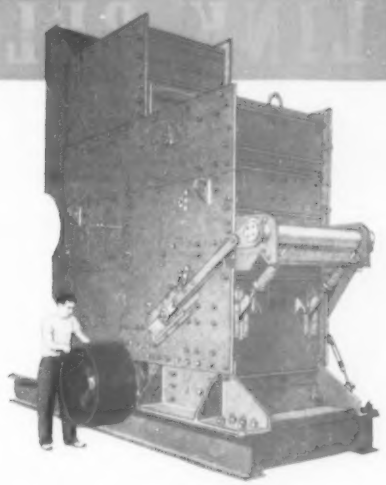
Any material freely passing into the feed opening can be reduced to specification material in one fast operation. In a closed circuit operation recirculating loads can be kept to a minimum.

3 CLEANER CUBICAL AGGREGATE

The terrific impact of the hammers produces a clean high quality cubical product. Sharp points and corners are eliminated. Clay, shale and other soft materials are disintegrated and passed off as fines.

4 LESS HORSEPOWER PER TON

Universal's Impact Master has only two moving parts — the two hammer rotors — and they both rotate freely in the same direction with the flow of material. Rock is broken by impact and the finished material is discharged immediately from the breaking chamber.



5 LOWER MAINTENANCE COSTS

With the breaking accomplished by the rotor hammers and the immediate discharge of the finished product through the deflector screen grate and lower grate, wear is kept to a minimum. Every part is readily accessible.

Impact Masters are available with capacities up to 750 tons per hour. Learn how the Impact Master can fit into your operations. Write or ask for full performance details.

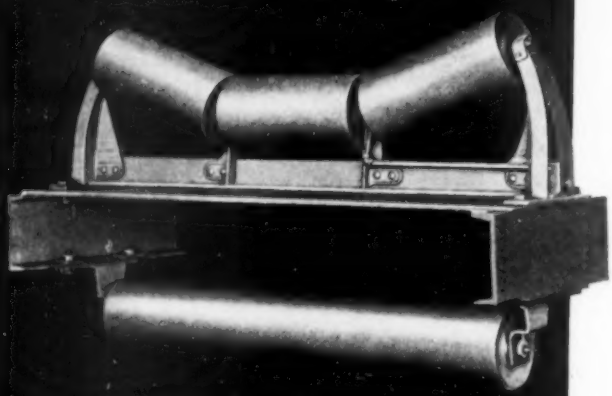
UNIVERSAL ENGINEERING CORPORATION
617 C Ave. N.W., Cedar Rapids, Iowa
a subsidiary of
PETTIBONE MULLIKEN CORPORATION
4700 West Division St., Chicago 51, Illinois

UNIVERSAL GAVE CEDAR RAPIDS ITS ORIGINAL FAME FOR QUALITY CRUSHERS **IN CEDAR RAPIDS SINCE 1906**

PMCP **UNIVERSAL**

ENGINEERED FOR TOP OPERATING PROFITS

For long-life, low-cost belt conveying . . .



standardize on

LINK-BELT IDLERS

FOR every step of your processing and handling, you can look to Link-Belt for a complete line of idlers. Each type is highly refined in design to minimize friction loss . . . assure maximum handling efficiency for the specific assignment.

You'll like their low maintenance, too. Grease-in-dirt-out seals preserve the lubricant. Dozens of other design features promote free-rolling, long-life action.

Choose from a full line of 20° and 45° troughing idlers in a variety of styles. Belt-training and flat belt idlers are also available. Ask your Link-Belt representative or distributor for your copy of new Book 2416.

Series "100" troughed rubber cushion idler.

Series "100" troughed belt-training idler, positive action type.

LINK-BELT

ROLLER BEARING IDLERS

13.240-A

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.

Here's the PRACTICAL, PROFITABLE Answer to your Aggregate Handling Problems

Lessmann HEAVY DUTY LOADER

The rugged, dependable, low-cost Lessman Loader takes a ton bite, has 11' bucket clearance and will dump at the very front of the highest truck when approached from the tail gate! Lessmann is completely hydraulic, has unrestricted visibility and many safety features which also make for fatigue-free operation. Available in ⅝ to 1¼ yard bucket capacity.

A single lever controls bucket forward thrust of 7½ tons *while unit is standing still!* Handles frozen aggregate with ease! Forks and crane hook available for handling cast concrete products.

The Lessmann Loader is a complete unit, built by the 34-year old Lessmann Manufacturing Company. Components such as driving axle, engine, hydraulic system are Timken, Ford, Vickers, Bendix, etc. . . . *parts with a pedigree* . . . Standardized Parts to minimize down time and maintenance cost.

Inclosed cab, Vickers power steering, and Bendix Hydro-Vac brakes are available as optional equipment. *Get all the facts and you'll get a Lessmann.*

Loading "Black-Top" at a mixing plant.

WRITE FOR **FREE FOLDER** GIVING COMPLETE INFORMATION

Lessmann MANUFACTURING CO.
2003 EASTON BLVD., DES MOINES 4, IOWA

Why "breathing space" between each wire?

To increase flexibility . . . a tiny, precise amount of "breathing space" has been engineered between each of the 265 wires in this Monarch Whyte Strand wire rope.

And to guard against corrosion and friction . . . special Macwhyte *Internal Lubrication* is force-fed around each wire before fabrication.

Macwhyte makes a thousand and one ropes to meet the needs of every type of equipment. Each is built with the exacting care that long, low-cost service demands.

Prompt recommendations on request.

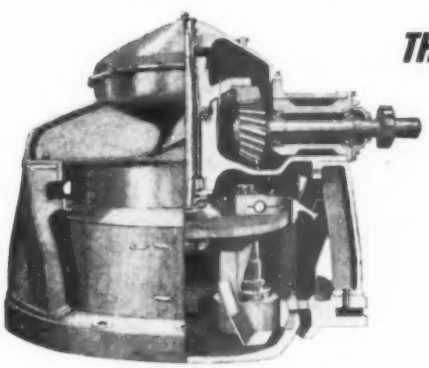
GET THE RIGHT ROPE FOR YOUR QUARRY EQUIPMENT

MACWHYTE WIRE ROPE

MACWHYTE COMPANY
2949 Fourteenth Avenue, Kenosha, Wis.
Mill depots: New York • Pittsburgh • Chicago St. Paul • Fort Worth • Portland • Seattle • Los Angeles • Distributors throughout U.S.A.
Ask for G-15 Wire Rope Handbook

Macwhyte 6 x 41 Filler Wire PREformed Lang Lay Monarch Whyte Strand with IWRC

BRADLEY HERCULES MILLS



THE QUICKEST AND MOST ECONOMICAL WAY TO INCREASE YOUR GRINDING CAPACITY

For the cement manufacturer with excess kiln capacity—operating compartment mills—the installation of BRADLEY HERCULES MILLS as preliminary pulverizers and converting the compartment mills to straight tube mills will result in INCREASED CAPACITIES of uniformly ground fine materials at an APPRECIABLE SAVING IN HORSE POWER. Automatic Control eliminates manual operation.

Investigate the new HERCULES MILL, a moderate priced mill, that can be installed in practically any existing plant at GREAT SAVINGS in horse power with increased capacities. A RUGGED MILL—designed for MAXIMUM ACCESSIBILITY—the use of new wear-resisting metals ASSURES CONTINUITY OF OPERATION.

WRITE FOR CATALOG NO. 60

BRADLEY PULVERIZER CO.

ALLENTOWN, PENNSYLVANIA

Weather Resistant

Hammond Multi-Walls assure complete protection of your products in any kind of weather. Being water resistant, they keep out snow, rain or sleet . . . keep contents dry and safe until bags are opened, and your products used. Why not call in the Hammond man near you. His main interest is in recommending the *right* Multi-Walls for the exact requirements of your products. Prompt deliveries are assured.

For Multi-Wall bags,
"make it a habit to depend on Hammond"

Hammond Multi-Walls

HAMMOND BAG & PAPER COMPANY

Plants in Wickliffe, W. Va., Pine Bluff, Ark., and Charlotte, N. C. Representatives in the following cities: CHICAGO, ILL. • BLUEFIELD, VA. • ST. LOUIS, MO. • KANSAS CITY, MO. MINNEAPOLIS • DETROIT • WASHINGTON, D. C. • NEW YORK, N. Y. • BOSTON • DALLAS, TEXAS

Hammers Rebuilt with MANGA-TONE N. M. and ISOROD Last Nearly Twice as Long as New Ones . . .

BEFORE - and - AFTER

This heavy duty hammer weighing 122 lbs. is used in a large cement plant.

When new this hammer was worn down in 11 days as shown in the illustration on the left.

After being rebuilt with MANGA-TONE N.M. and ISOROD as shown on right it stood up under the normal terrific impact for crushing for a minimum of 19 days.

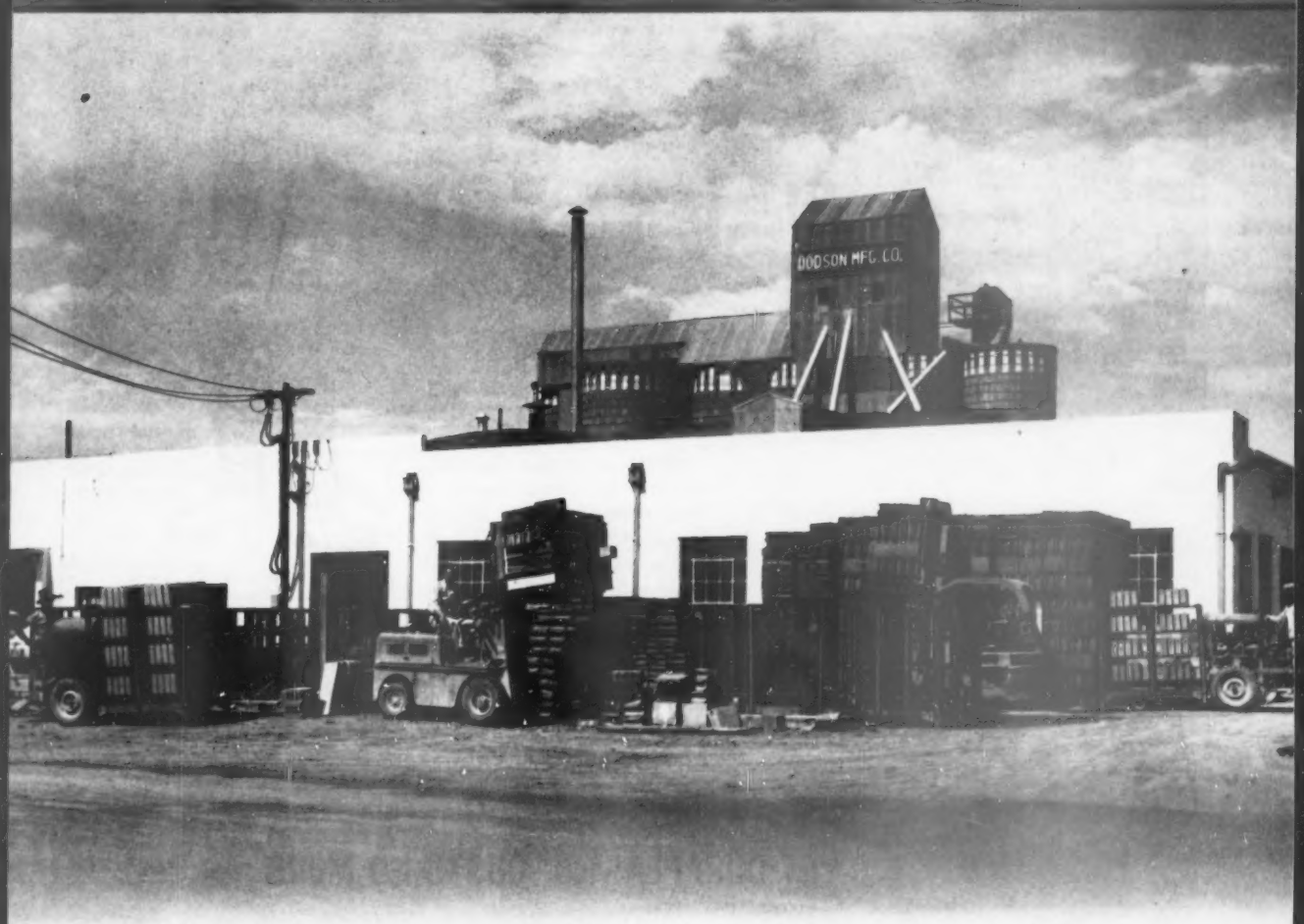
Your regular maintenance welder can make similar savings for you. Let our Field Man show you the economies which are possible in your operations.

RESISTO-LOY CO. *Manufacturers,* **GRAND RAPIDS 7, MICHIGAN**

CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE



Plant of Dodson Manufacturing Co., Wichita, Kan.

"NIFTY" tells how to make a 300,000-block sale!

"Look sharp," the Army says. And that fits me to a T. When you're after big sales, remember—people remark on the clean, true edges and corners of blocks made with Duraplastic. Face texture is richer, too. No wonder I just helped 300,000 Duraplastic-made blocks find a home in the Army!
TEXAS CONCRETE WORKS

"Thrifty" says:

I can help you save a pretty penny on production. Fewer culls and throwbacks... less breakage in handling green products all add up. Manufacturers report real savings with Duraplastic.

WHEN the Texas Concrete Works at Waco landed a whopping order for 300,000 concrete blocks for Ft. Hood, it wasn't surprising. They use Atlas Duraplastic Cement exclusively, manufacturing blocks and pipe. And they know Duraplastic makes better-looking concrete products with increased resistance to passage of water.

YOU'LL FIND—Duraplastic Cement makes a more cohesive, rubbery mix which holds together better, feeds easily through machines. Unsurpassed for concrete block, brick, pipe, drain tile and silo staves.

YET DURAPLASTIC* COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company

ER-B-143

ATLAS® **DURAPLASTIC**

AIR-ENTRAINING PORTLAND CEMENT

Makes Superior Concrete Products at No Extra Cost

INDUSTRY NEWS

New Concrete Product

CONCRETE MOLD & ENGINEERING Co., Battle Creek, Mich., has announced the development of a concrete and steel garbage can rack or bench, designed in cooperation with

Elevated concrete bench, in addition to improving appearance of garbage or trash can, helps reduce rat menace

the Battle Creek and Detroit, Mich., Boards of Health, as a means of retarding the rat menace. Many U.S. communities now have ordinances stating that all garbage and rubbish cans must be elevated. In addition to reducing the rat menace, the concrete benches or racks help to improve the appearance of a necessary but usually unsightly item. The racks are designed to accommodate one, two or more cans for home or commercial use.

Concrete Research Laboratory

MARIETTA CONCRETE CORP., Marietta, Ohio, has begun construction of a building for concrete products research and development. The building itself is the culmination of experiments in a new technique in concrete construction. Sheets of Styrofoam, a cellular insulation material, are fastened to a wood frame, reinforcing mesh is secured to this and then concrete is sprayed on by the Jet-crete process. The interior is finished by applying an inch of cement plaster. This method of construction is still in the experimental stages.

Sales Promotion Stunt

PICONE BROTHERS BLOCKS AND BRICKS, INC., Tullytown, Penn., has issued a booklet which shows home owners and other prospective customers how to build their own patios at a considerable savings in cost. The booklets are given free of charge upon request to the firm.

Picone Brothers Blocks and Bricks, Inc., was founded in Brooklyn, N.Y., in 1922. Its plant in Tullytown was established in February, 1952. Branches of the firm are also located at Farmingdale and Jamaica, L. I. Waylite cinder and concrete block and brick, lintels and colored concrete patio block are produced. Outdoor fireplace kits, ready for easy assembly, are also featured by the company.

Officers of the company are Salvatore Picone, president and manager of the Brooklyn office; John T. Picone, secretary and manager at Tullytown; Joseph S. Picone, treasurer and manager in Farmingdale; and John Liely, manager of the Jamaica branch.

Expands Pipe Plant

CONCRETE PIPE CO., Sandusky, Ohio, recently completed extensive remodeling and enlargement of its plant facilities, in preparation for supplying one of the largest orders in the history of the company, according to Russell J. Dann, plant manager. The company has a contract to supply concrete drain pipe for the Ohio turnpike.

The addition to the plant includes a new 22- x 90-ft. building for steam-curing pipe. The additional facilities will increase plant capacity by 50 percent. Pipe up to 54 in. in dia. will be produced.

Ready-Mix Plant

LAKELAND CEMENT CO., Lakeland, Fla., producer of concrete drainage and sewer pipe, recently began operation of its new ready-mixed concrete plant at Lakeland. The new "push-button" plant has a 100-cu. yd. capacity. Plant facilities include a 750-ft. conveyor belt, an 1800-bbl. cement storage silo, a storage yard with a capacity of 200 carloads of aggregate, and a 250-ft. railroad trestle to provide rail access to the plant. Owners of the company are Shelly and Palma Gordon. Francis Pipkin has been named superintendent of the ready-mixed concrete operations.

Cover Picture

DODSON MANUFACTURING CO., Wichita, Kan., one of the largest manufacturers of concrete stave silos, has expanded its activities to include a new type 8- x 10- x 32-in. dry-well block as well as standard 8- x 8- x 16-in. block. It also manufactures grain bins, water tanks and "Drytite" paint, and is a distributor of Zonolite plaster and concrete aggregates. The story of this company's rise to leadership in the concrete products industry is told in this issue.

Prestressed Beams

MAULE INDUSTRIES, INC., Miami Beach, Fla., recently signed a contract to manufacture the first prestressed concrete beams to be used for a commercial structure in southeast Florida. The beams, which will have a span of 49 ft. 3 in., will be 40 in. high and weigh approximately 12 tons each. The beams are being cast at Maule's plant near International Airport.

KEN-CRETE PRODUCTS CO., INC., Truesdell, Wis., during its six years of operation, reportedly has multiplied its production five times. Current production is approximately 1000 concrete block per hour. Officers of the company include Arnold Johnson, president, and Ted Christensen, secretary-treasurer.

GAINESVILLE READY-MIX CONCRETE Co., Gainesville, Texas, established in September, 1952, has expanded its operations by the addition of a second ready-mixed concrete plant at Whitesboro, Texas. The company now operates a fleet of six transit-mixer trucks. Owner of the company is Boyd Ware.

HANCOCK CONCRETE PRODUCTS CO., Hancock, Minn., celebrated its 36th anniversary by holding open house at its plant. The plant was purchased in 1916 by Henry Schmidgall, and an expansion program was begun in 1917. The firm produces concrete pipe and engages in road construction work.

MODERN BUILDERS SUPPLY, owned by John Cotes, Oceanside, Calif., has obtained a 5-year lease from the city of Oceanside for a 5-acre site for a proposed concrete block plant. The lease calls for a $100-per-month rental fee, with an option for renewal at the end of that period.

J. A. LUTON READY-MIX CO., owned by J. A. Luton, formerly of Burley, Ida., has opened a ready-mixed concrete plant at Riverton, Wyo. Facilities include a mixing plant and two trucks of 3- and 4-cu. yd. capacities.

DALTON COAL & MATERIALS CO. has announced plans to build a ready-mixed concrete plant in Columbia, Mo. The plant is scheduled to be in operation by March 1, 1954, according to Sam F. Dalton, president.

READY-MIX CONCRETE & LUMBER Co., Algona, Iowa, is expanding its operations by the addition of a new concrete batching plant and two additional transit-mixer trucks.

WEMIX CO. is a new firm recently established at Greenville, Texas, by H. D. Baker, Denton, Texas, for the production and sale of ready-mixed concrete and other building materials.

WILSON CONCRETE CO., which operates concrete pipe plants in Grand Island, Neb., Council Bluffs and Red Oak, Iowa, has opened a ready-mixed concrete plant at Omaha, Neb.

W. G. TRAVER SUPPLY CO., Decatur, Ill., has announced plans to build a new concrete mixing plant just north of the Decatur city limits.

WADENA READY-MIX PLANT has been established at Wadena, Minn., by John A. Olson & Sons and Tony Busker.

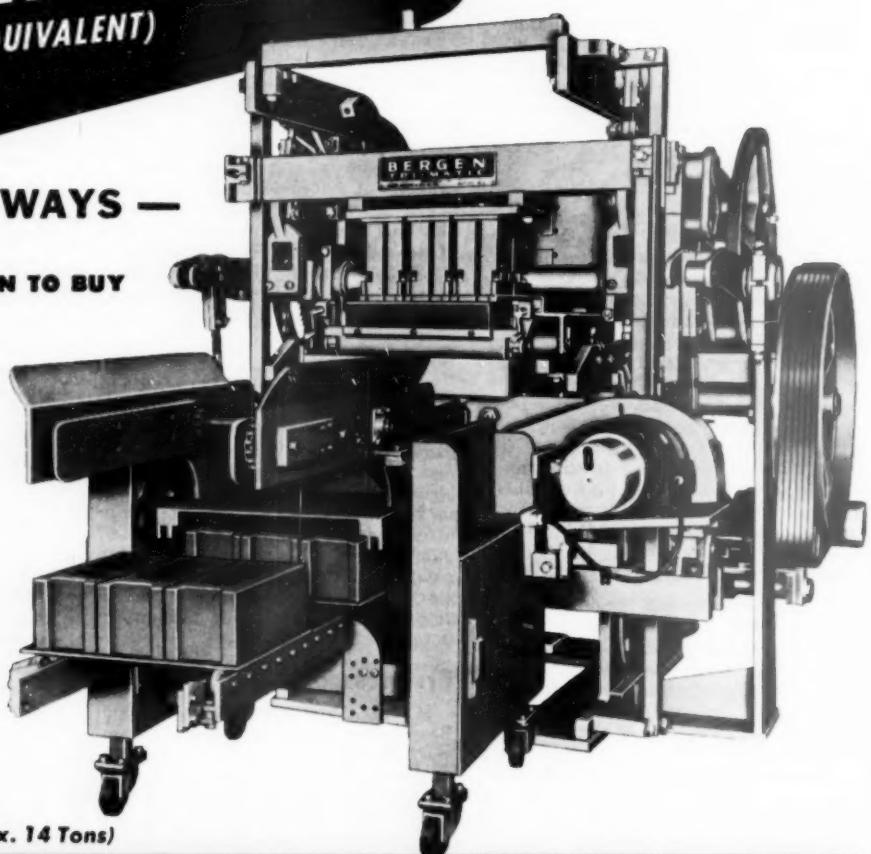
A NEW CONCRETE BATCHING PLANT has been established at Chicago Heights, Ill., by Alex Valente. Joe Ignelzi is plant superintendent.

BERGEN TRI-MATIC

with **FRONT PALLET RETURN**

1,000 BLOCK PER HOUR

(8" EQUIVALENT)



AVAILABLE 3 WAYS —

- **ON LEASE BASIS**
- **LEASE with OPTION TO BUY**
- **OUTRIGHT SALE**

(Shipping Weight—Approx. 14 Tons)

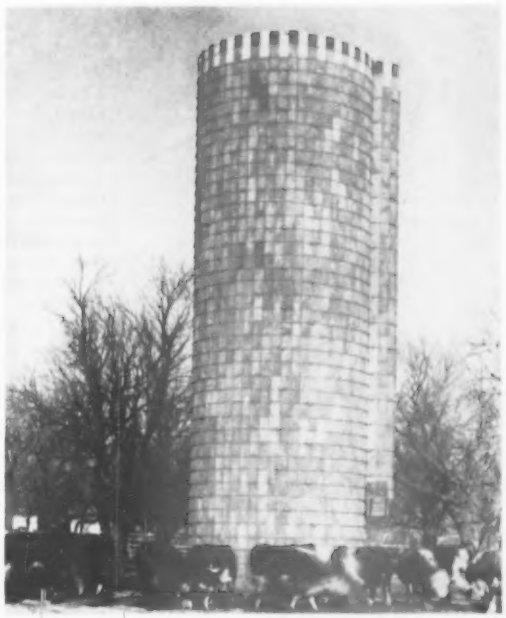
BERGEN MACHINE & TOOL CO., INC., NUTLEY, N. J.

Selling Methods That Built A Profitable

FARM MARKET

Dodson Manufacturing Co., operating three plants in Kansas, has grown to be one of largest manufacturers of concrete silos, bins and water tanks, and is now making a new type concrete masonry unit. Selling is based on service to the farmer

By TIP BROWN



Red and white topped concrete stave silo is the identifying trade-mark for Dodson silos

IN A COUNTRY where cowmen are rated as successful leaders in their communities, Leon and Glenn Dodson, who run the Dodson Manufacturing Co. plants at Wichita, Concordia, and Cherryvale, Kan., are cowmen extraordinary. Much of their popularity with other cowmen and even with the cows themselves springs from a slogan that is familiar to farm paper readers in the southwest, "you, too, can be popular for only $38." That's the usual price consideration to close a contract for a Dodson "Red and White Top" cement stave silo. As for the cows, they grow sleek and good natured on the rich, vitalizing silage from these self-same red and white topped silos.

This modern adjunct to successful farming looks very simple on the surface, but present efficiency has been built over many years, and almost a half century has passed since D. W. Dodson, the father, drove a horse and buggy throughout the country around Oskaloosa, Iowa, and sold wooden silos to none too prosperous farmers. Drought had reduced sales to almost nil and the silo business was on the rocks. In an emergency, Mr. Dodson talked four local farmers into making a trip to Elgin, Ill., to investigate a new type of silo made of concrete staves. As an incentive, those who contracted for the new silo were to have traveling expenses refunded. Three of the farmers made purchases, and the fourth eventually sold his farm and went into manufacturing them with Mr. Dodson. The partners bought one of the first silo machines for this purpose from the New Monarch Machine & Stamping Co.

The lure of the booming country around Wichita, Kan., caused the Dodson family to move from Iowa to Kansas and in a short time to establish a concrete stave silo plant in Wichita. Glenn and Leon Dodson, the sons, grew up in the crude methods of the day of hauling sand by team and wagon and mixing concrete by hand. A portable stave silo machine was used, and the customary manner of building silos on the farm was to load a box car with horses in one end and machinery and equipment in the opposite end. The father went ahead of the erection crew, and the two sons were crew for the most part and salesmen for the rest of the time.

The budding company had been paying a $40 royalty for use of a patented Playford silo stave machine, but by 1914 had reached a stage where they were able to purchase for $6000 the state rights in Kansas and Oklahoma of the Poyser patents covering the so-called interlocking stave silo. This resulted in a considerable financial advantage over the former method.

With the introduction of power mixing in 1916, hand labor at the Wichita plant began to fade out. A year later, power tamping came into use and soon became standard equipment on stave silo machines. A third innovation of the business, and a rather sensational one at the time, was the purchase in 1946 of a semi-automatic silo stave machine, which made around 2200 staves per day, from DeMuth Steel Products Co.

Introduce New Products

The final transition from the horse and buggy era of the previous 44 years was the installation of a new Besser Vibrapac air-cell type machine making two products, the air-cell stave silo block and a dry-wall building unit. This leviathan of the block machine family weighs 17 tons, and is capable of producing up to 6000 staves per day or two 8- x 10- x 32-in. dry wall blocks per cycle or an 8-hr. daily production of 4800 units. Changeover in the type of manufac-

Concordia, Kan., plant, one of the three Dodson plants, showing stockpile of concrete staves

Leon Dodson

ture requires but 1½ hr. The machine is one of five installations now in service and a sixth machine is being installed in Florida.

In recent years, a new 8- x 10- x 32-in. concrete block unit has been developed by the Marietta Concrete Products Co., which is self-aligning, is laid in the wall dry, and vertically reinforced by prestressing steel rods which are tied into the foundation. The Dodson Manufacturing Co. has adapted this new unit to their Dodson line of special Haydite units of 6-in., 8-in., and 12-in. thickness by 12 in. wide and 16 in. high with the addition of prestressed steel horizontal reinforcing. The new Dodson wall, therefore, will be prestressed steel reinforced vertically and horizontally.

The new unit weighs about twice as much as the lightweight 8- x 8- x 16-in. block, and is two and a half times greater in surface area. Further expansion of this new lightweight unit is being planned for use in the house construction field with a special appeal to the rapidly increasing number of "do it yourself" type builder.

Advertising and Selling Methods

The pace of manufacturing advance has been equalled in every way by marketing methods that have had the fundamental purpose of a universal service for the buyer coupled with aggressive selling through an organization of capable and well paid salesmen, expert advertising counsel, and no tightening of the purse strings in selling effort.

Dealerships are established throughout Kansas, Oklahoma, Texas, and southwest Missouri with a complement of 13 territory salesmen and with an experienced builder on each piece of new silo construction. The product is easily identified by the top course of alternating red and white colors of "Drytite" waterproofed, masonry paint which is produced in the Dodson plant and has excellent public acceptance.

Getting prospects for Dodson products was for many years an activity that took long and arduous efforts at state fairs, utilizing direct contacts and an endless supply of trade literature on Dodson boards, concrete stave silos, grain bins, water tanks, stucco, Zonolite plaster and concrete aggregates, and the previously mentioned "Drytite" paint. A sizable fortune has been expended in printing and distribution expense not to mention the gray matter that has been contributed to art work, copy, and planning.

The years have brought their own rewards for these efforts and prospecting is no longer such a chore. State fair exhibits at Hutchinson and Topeka, Kan., and Oklahoma City and Tulsa, Okla., are attended annually by a million people. Displays are realistic replicas of products that are designed to immediately arouse interest and attention.

Seasonal advertising in the state farm papers of the territory stress the delivery of a silo for $38, which is the usual monthly payment over a three-year period on the standard size. A financial plan is worked out for the down payment and deferred amounts which has created for the company a continuous credit situation of a third of a million dollars "on the float." Only three losses have been sustained since 1938 in this method of credit extension, a high performance record and safety factor of dealings with the live stock industry.

Radio has proved a good business getter, and one local Wichita station has been used for the past three years for two days per week of 15 min. broadcast in combination with market reporting. Sales of water tanks, alone, from this source have supported the cost of the advertising. A second local station is now being used on a three-day per week schedule tieing in with a farm program. The two branches of the Dodson company which make standard concrete staves benefit along with the parent company in all phases of the advertising program.

Close contact with farm and home problems has drawn the Dodson brothers into many practical experiences in reaching a specialist stage in manufacturing. As an example, for some time, the company has been a distributor of the Zonolite brand of expanded vermiculite through retail lumber dealers in three-fourths of Kansas and the northern tier of Oklahoma counties, and has participated in a growing demand for loose fill and plaster and concrete aggregates for fireproofing, insulation, and acoustical needs. The company has its own expanding plant at Wichita with silo storage for 12 cars for vermiculite.

Another expansion of activities brought on the organization of Silage Equipment, Inc., of Wichita, manufacturers of the McLean augur type silo unloader which unloads up to

Glenn Dodson

400 lb. of silage per minute and is a potent factor in aiding new silo contracts. Inquiries are received from all over the country about this invention which eliminates 200 to 400 hr. of hand labor during the average feeding season. Five distributors are now engaged in handling sales nationally.

Perhaps no effort of the company to become part and parcel of the market they serve has brought more personal gratification than the 320-acre farm 12-miles east of Wichita operated by the Dodsons for breeding registered Angus cattle and registered Holstein dairy cattle. The farm has been the means of undergirding sales presentations to farmers who are quick to sense any impractical aspects of selling talk.

The present Wichita plant covers 2¼ acres or 98,000 sq. ft. of area. The floor space is 18,000 sq. ft., and the remainder is utilized for outside storage. A new office building and added plant capacity are in the plan stage for the south 125 ft. of property. Total employes number 100.

Officers of the company are Leon A. Dodson, president; Glenn R. Dodson, secretary and vice-president; Mrs. Leon Dodson, treasurer and office manager. Other officials of the company are Chas. Cooley, engineer; Robert Neff, production manager of concrete materials; C. C. Whited, manager of the Zonolite department; Jake Ewerts, manager of production for Zonolite and steel fabricating; Chester McWilson, manager Concordia plant; Frank Radcliff, Jr., manager Cherryvale plant.

From this array of men and machines to carry on a business geared to the present day needs of agriculture and building emerges the figure of a far-seeing, resolute salesman of the horse and buggy era who built his business structure upon the solid foundation of good materials, competent workmanship and sound marketing principles.

At the speakers' table are, left to right: H. Loren Thompson, president, Portland Chapter, American Society of Civil Engineers; Robert C. Shoemaker, president, Portland Chapter Professional Engineers of Oregon; E. A. Peterson, general manager, Rocklite Products, Ventura, Calif.; George Bickel, secretary of institute and sales engineer, Featherlite Corp., Dallas, Tex.; Charles E. Andrew, chief engineer, Washington Toll Bridge Authority, Tacoma, Wash.; Cedric Willson, chairman, technical problems committee of the institute, and vice-president and chief engineer, Texas Industries, Inc., Dallas, Tex.; S. Carl Smithwick, president of the institute and also president of Smithwick Concrete Products, Portland, Ore. In foreground is Dwight DeHaven, manager, Eugene Div., Smithwick Concrete Products; and A. G. Streblow, president Basalt Rock Co., Napa, Calif., and past-president of the National Concrete Masonry Association

E.S.I. Holds Open-Forum Meeting

THE EXPANDED SHALE INSTITUTE held its annual fall meeting in Portland, Ore., September 23-26, 1953. S. Carl Smithwick, president of the institute, in his opening address, pointed to the fact that in the span of little more than a year, membership of the institute has increased by 67 percent, the members representing approximately 75 percent of the total production of expanded shale by the rotary kiln process in the United States and Canada.

The institute has embarked upon a comprehensive research program. Currently underway at the University of Toledo is an extensive research project covering shrinkage, modulus of elasticity, flexure and compressive strengths of expanded shale concrete from all member producers. (See ROCK PRODUCTS, September, 1953, issue, p. 166.) Four other research projects, to be conducted during the coming year, were authorized by the institute at the recent meeting. These projects are: Concrete masonry fire tests; study of volume change; research in plastic flow; and design of insulating roof decks.

Following three days of board sessions and intensive committee work, the members of the institute met in open session, to which were invited members of the American Institute of Architects, the American Society of Civil Engineers and Associated General Contractors. The program included the following addresses: "The Story of Selma" (recounting the commendatory performance of expanded shale concrete submerged in salt water for 34 years), by Cedric Willson, chairman, technical problems committee of the institute, and also vice-president and chief engineer, Texas Industries, Inc., Dallas, Texas; "Promotion and Uses of Expanded Shale in Southern California," by E. A. Peterson, general manager, Rocklite Products, Ventura, Calif.; "Precast and Prestressed Lightweight Concrete," by Robert Lochow, structural engineer, Portland Cement Association, Seattle, Wash.; "Extensive and Versatile Uses of Expanded Shale Concrete in the Southwest," by George Bickel, secretary of the institute and sales engineer, Featherlite Corp., Dallas, Texas.

Banquet for the directors and guests, at close of convention, was held at company offices of Smithwick Concrete Products. Shown at head table, clockwise from left are: Mr. and Mrs. Cedric Willson, Texas Industries, Inc., Dallas, Tex.; Warren W. Allen, Hydraulic Press Brick Co., St. Louis, Mo.; Mayor and Mrs. Fred L. Peterson, Portland, Ore.; S. Carl Smithwick, Smithwick Concrete Products; Charles E. Andrew, Washington Toll Bridge Authority, Tacoma, Wash.; G. S. Paxson, Oregon State bridge engineer and chairman of the bridge committee of A.A.S.H.O.; Mrs. Paxson; Carvel Linden, president of Portland Chamber of Commerce; and Frank McCaslin, president, Oregon Portland Cement Co., Portland, Ore.

Bridge Floor Pavements

Highlight of the meeting was an address by Charles E. Andrew, chief engineer, Washington Toll Bridge Authority, on "Structural Uses of Expanded Shale Concrete." Mr. Andrew was designer and builder of the new Tacoma Narrows bridge, the deck of which was paved with expanded shale concrete. He was also principal engineer of the San Francisco-Oakland Bay bridge, the deck of which was also of lightweight concrete; and he was principal engineer of the large expanded shale concrete shipbuilding program, near Oakland, Calif., during World War II. Following are excerpts taken from Mr. Andrew's address:

"We in the engineering profession have for many years learned to highly regard the uses and potentialities of expanded shale concrete. . . . I think there are a good many things in the great field of construction that we are engaged in now that could be more economically done if expanded shale aggregates were used to a greater extent than they are now. There has, until now, been a dearth of authentic information disseminated to engineers, architects, and designers on that subject. That is why we members of the construction industry are gratified that the Expanded Shale Institute was organized by the producers of the material in the United

(Continued on page 162)

Ready-Mix Producer

Organized for SERVICE and EFFICIENCY

Plant No. 4 near Lunken Airport, Cincinnati, with mixer truck fleet in foreground

By BROR NORDBERG

Hilltop Building Materials, Inc., Cincinnati, Ohio has advanced ideas on production of a quality product, cost control, maintenance and sales promotion

WE RECENTLY HAD AN OPPORTUNITY to read a most attractive, illustrated brochure entitled "The Story of Hilltop Service" which was published and distributed by Hilltop Building Materials, Inc., producer of ready-mixed concrete in Cincinnati, Ohio. This booklet is one of the finest we have seen in style of presentation and in coverage. It has had a distribution of some 3000 copies to regular and active customers, contractors and subcontractors, suppliers, personal friends of the company, and others who might become interested in the company and its products.

Designed to acquaint its readers with the inner workings of the company, the booklet covered the company's history, personnel, policies, facilities and experience. Upon reading it, we gained the impression that here was a concern that not only recognizes quality of product and reliable service to be the backbone of its business but one that is organized and equipped to carry out these objectives. The stress on laboratory control, safety, preventive maintenance, specialized services for customers, organization of personnel as presented, had as its objective to stimulate a desire on the part of readers of the booklet to want to learn more about the company and its services. We had our curiosity aroused and made a special trip to Cincinnati to develop this article. Upon arrival we soon learned that many individuals and companies had a similar reaction to ours, proving that well-presented, informative literature can do an effective job of building respect and acceptance for a company that is trying to do a sound job for its customers.

General offices, largest material warehouse, and principal mechanical shops are located at Price Hill plant in Cincinnati

Hilltop Building Materials, Inc., has four ready-mixed concrete plants serving Greater Cincinnati with its population of one million, and has expanded into Dayton, Ohio, where a separate organization has been set up and where two modern plants are in operation.

History-Development

There are two phases to the history and development of the company. The original Hilltop Building Materials Co. was established in 1928, making it a pioneer in the field of ready-mixed concrete. Cincinnati was one of the first major metropolitan areas to use ready-mixed concrete extensively and, today, 95 percent of all concrete for general purpose construction is central mixed or mixed in transit. The early company was essentially a suburban operation serving the Western Hills section of Cincinnati, originally from one plant. This is the No. 2 North College Hill plant, presently operated as one of four blanketing Greater Cincinnati. The Price Hill plant, now designated as No. 1, was built in 1933. It serves the downtown and western areas and is the location of the company offices.

The early company was purchased in 1941 by a corporation headed by I. W. Steele, which had plans for immediate expansion to serve the entire Cincinnati area, covering all its

seven hills. Expansion was retarded by World War II, but during the years of restrictions to growth the company gained valuable experience through serving many war-time projects and had the opportunity to train its personnel and gain a foothold with many larger customers.

Expansion

Immediately following the war, a rapid program of expansion was inaugurated. A large fleet of transit-mixer trucks and other types of vehicles was acquired and a well-integrated plan of preventive maintenance was initiated which is one of the most interesting features of the company's operations. Inventories of hard building materials were enlarged and new lines of products were added. Approximately 40 percent of the company's total dollar volume of sales is of building materials available from warehouses established at each ready-mixed concrete plant.

In 1949, Hilltop plant No. 3 was built in St. Bernard to serve the northern area which is largely industrial, and a warehouse was built at this location. In 1951, Hilltop plant No. 4 was built adjacent to the Lunken airport in the eastern part of Greater Cincinnati where great expansion is anticipated in the early future. A warehouse was built there in 1952.

Hilltop-Dayton, Inc., was organized in 1951, taking over a plant in Dayton, Ohio, and enlarging it. The Belmont plant (No. 2) in Dayton was built in 1952.

Policies

In Cincinnati the company now has plant capacity to batch 3000 cu. yd. of transit-mixed concrete in a 10-hr. day and operates a fleet of 86 tandem-type mixer trucks. Equipment facilities and volume of business have expanded many times since the old company was taken over. With few exceptions, any construction job in the Greater Cincinnati area can be served concrete with a haul not to exceed eight miles from the closest plant.

The company considers eight miles to be the desired maximum haul when mixing in transit, as a safeguard against over-mixing and for better utilization of mixer trucks and control of service. Orders requiring a haul of 15 to 20 miles, often made by other producers in the industry, are not accepted. Length of average haul desired was correlated with studies of anticipated area development in the establishment of locations for plants.

The newer plants were located so as to be in the center of expanding construction activity as anticipated for the future rather than in areas already built up or approaching saturation. Approximately 75 percent of total sales of transit-mixed concrete at present are for the building of homes and commercial structures. Among typical larger projects recently served were a catalytic cracking plant for an oil refiner that required concrete to be poured at the rate of 120 cu. yd. per hour, foundations and slabs for a 910-apartment housing project, a large city water reservoir, suburban shopping centers and many other noteworthy structures.

Plant No. 4, in eastern Cincinnati, looking toward batching plant

President Steele was formerly in the investment banking business and had operated his own investment company, I. W. Steele and Co., Inc., in Rochester, N.Y., before coming to Cincinnati. Vice-president Charles O. Dittrich's background represents many years of experience in the building materials business in Cincinnati. Other officers and key personnel have come up through the organization and its predecessor company. The accumulative experience of these men in the industry and Mr. Steele's financial background, together with his advanced ideas on cost control, organization and sales promotion, have combined to develop business practices and policies that remind us much of the successful methods of big industry.

All operations are based on the fundamental principle that the company is in business to sell concrete quality—not just concrete itself—and to provide reliable service. It is an established principle that concrete orders will not be over-scheduled; that it is better to reject sales than jeopardize the company's standards for service. This emphasis on service requires that mobile equipment become quickly available for rescheduling, and led to the de-centralization of batching plants.

In order to enable having control of length of haul, the newer plants are of bolted construction so that, in the future, they can be moved to new locations should centers of construction activity shift.

Another policy is not to infringe on contractors in efforts to sell concrete and, where desirable and practicable, to make available special service equipment to contractors. The company has two Mixermobiles that are often desired by contractors on sizable pours where the concrete must be elevated to considerable height. Use of this equipment makes it unnecessary for the contractor to move in cranes and other heavy equipment to build certain structures. Also, jobs of sufficient size but remotely located from any of the established batching plants can often be served quicker and without interruption by use of this equipment. In Cincinnati it is a practice, in deference to the contrac-

Plant No. 3, St. Bernard, one of the newer operations started after the close of World War II

I. W. Steele, president

Charles O. Dittrich, first vice-president

John F. Steele, vice-president

tor, not to pour ready-mixed concrete on Saturday.

Among other facilities and practices, all related to quality and service, are a central laboratory at plant No. 3 and the program for preventive maintenance which we discuss later herein. The company considers the trucking operations as a separate phase of the business and these operations are set up so that there is accurate cost control and security against breakdowns that would interrupt service. To keep the trucks rolling, there is a ratio of one employe backing up each driver, which is probably more than the average for the industry but is considered essential to continuity of service.

Organization-Personnel

Backing up the officers who are responsible for the business is a secondary group of key personnel coming up through the organization, some of whom were retained from the original company. The company has a board of management, a program for long-range development and has a functional organization manual that fixes the responsibility and delegates the authority for each key man in the organization so that each man positively knows what is expected of him and his fellow workers. This is most essential in an organization that has department heads responsible for maintenance, safety and other activities that necessarily dovetail and overlap the responsibilities of production heads.

The functional organization manual covers the company's broad policies including its desire for honest dealing, good customer and employee relations, courtesy, and it frowns upon political alliances and subsidies in the conduct of business. It discourages the acceptance of free entertainment, forbids price cutting and cautions against making rash delivery promises. It is an excellent presentation on the ethics of business conduct. In its coverage of practices, it is expressed in writing that all plants must be kept in top condition and that they be kept painted and presentable for the advertising value, that the company and key individuals support and belong to appropriate local or national trade associations considered to be valuable and that they be represented in appropriate civic and community affairs. The company is, among other organizations, a member of the National Ready Mixed Concrete Association, the Ohio Ready Mixed Concrete Association and the American Concrete Institute.

The need for a functional organization manual is apparent from the list of officers, key personnel and the departmentalization which requires that production managers and maintenance supervisors know how they must coordinate their efforts so that each may exercise his full responsibilities.

Officers of the company include Irving W. Steele, president and director; Charles O. Dittrich, first vice-president and sales manager; John F.

H. Paul Pitzer, treasurer

Mrs. I. W. Steele, secretary

Herbert E. Ritchie, assistant secretary

Frank Kroll, truck maintenance supervisor

Charles W. Williams, plant maintenance supervisor

Thomas D. Harrington, safety director

Steele, vice-president; Paul Pitzer, treasurer; Mrs. I. W. Steele, secretary and director; and Herbert E. Ritchie, assistant secretary and director.

Key department personnel comprise Robert F. Richey, comptroller; John Pierre, production superintendent; Edward Froehlich, assistant sales manager; Arwood F. Liggett, in charge of concrete engineering; George Rieman, senior plant manager and new plant development; Edgar Pitzer, superintendent of fleet maintenance; Charles W. Williams, plant maintenance supervisor; Frank Kroll, truck maintenance supervisor; and Thomas D. Harrington, safety and personnel director. Each plant has a manager and separate dispatchers for concrete and building materials.

President Steele presides over meetings of the board of management, which conducts monthly meetings of department heads. First vice-president Dittrich sets the sales policy and supervises sales activities. The production superintendent has general supervision for the production of concrete, visits all plant operations on a regular schedule, does much of the trouble shooting, has overall responsibility for the cleanliness and efficiency of plant operations and sets up the system for allocation of truck equipment. He reviews working agreements, negotiates with unions in disputes, and presides over monthly meetings of the plant managers. Supervisors of plant maintenance and fleet maintenance are responsible to the production superintendent and to the president as is the safety and personnel director.

Maintenance supervisors have the authority to draft plant workers in the event of emergency and are expected to have the cooperation of the plant managers. Scheduing of needed repair and maintenance work in the plants is done with the production superintendent. Plant managers have the responsibility for customer relations which involves continuous stress on the education and training of the truck drivers. They must also anticipate breakdowns in advance and maintain their plants at top efficiency. The important problem of maintaining good relations with neighbors is also their responsibility.

Irving W. Steele, Jr., secretary, Hilltop-Dayton, Inc.

Batching Plants

As we have already stated, there are four strategically located batching plants to serve Greater Cincinnati. The two newer ones are designed to permit their removal and relocation should that ever become desirable because of a shift in construction activity. These newer plants are of steel construction and they provide for large reserves of aggregates in stockpiles. All concrete is mixed in transit.

Hilltop plant No. 1 (Price Hill) is on a siding of the C & O RR and has a capacity of 900 cu. yd. of concrete in 10 hr. Aggregates are received by rail and elevated by bucket elevator into an 8-compartment reinforced concrete silo. Cement may be received either by rail or truck. This is a one-stop plant that can batch and discharge 4 cu. yd. of concrete into mixer drums in 90 seconds. It was built in 1933. George Rieman and Alvin C. Baum are co-managers.

Hilltop plant No. 2 (College Hill) has a capacity of 600 cu. yd. in 10 hr. and is entirely a trucking plant. Storage is in silos of precast concrete staves fed by skip and a bucket elevator. Bulk cement is shipped to the plant in trucks. This plant was built in 1928 and is managed by George Koehler.

Hilltop plant No. 3 (St. Bernard) is the first of four modern steel plants built by the company and is located in an area where 40 percent of Greater Cincinnati's industry is concentrated. This plant is equipped to receive aggregates and cement either by rail or truck. The plant has steel bins filled by bucket elevator and has provision for stockpiling aggregates which are rehandled to the elevator

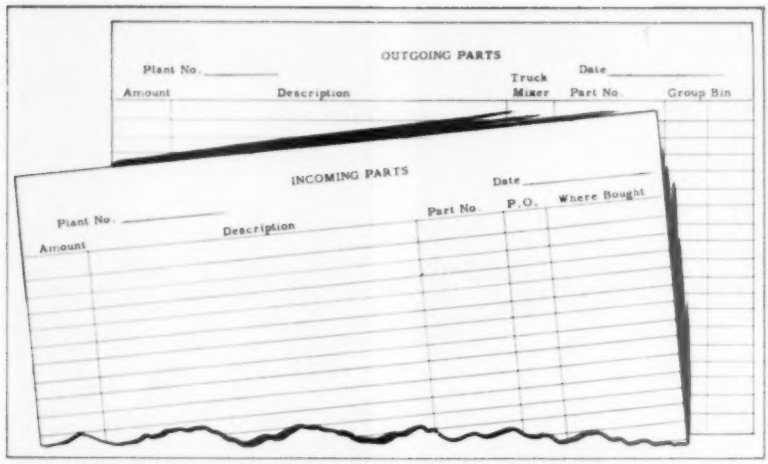
Robert Roth production manager, Hilltop-Dayton, Inc.

Arwood F. Liggett, in charge of concrete engineering

John Pierre, production superintendent

Raymond Greenwell, concrete manager, Plant No. 1

Lyman Beckett, manager, Plant No. 3



Outgoing and incoming parts forms are on 5½ x 8½-in. sheets

feed hopper by 1-cu. yd. Hough loader. This type of equipment is standard in several of the plants. Lyman Beckett is manager.

Hilltop plant No. 4 in eastern Cincinnati is the newest and is equipped to receive aggregates and bulk cement either by rail or truck. This is a steel plant and is fed aggregates by belt conveyor. The plant area is paved for large stockpiles and a Hough loader is the means of delivering aggregates from stockpiles to the conveyor feed hopper. This is a Blaw-Knox plant with a capacity of 800 cu. yd. in 10 hr. Swain Flinchpaugh is manager.

Truck Equipment

The mixer fleet consists of 86 units, of which two-thirds are rated at 4½ cu. yd. capacity as mixers and the balance are 3 cu. yd. Most of the larger units are Smith high-dumps and the balance are Rex, Jaeger and Blaw-Knox. Cincinnati being noted for its hills, the company has standardized on Mack A-40 10-wheel tandem drive chasses.

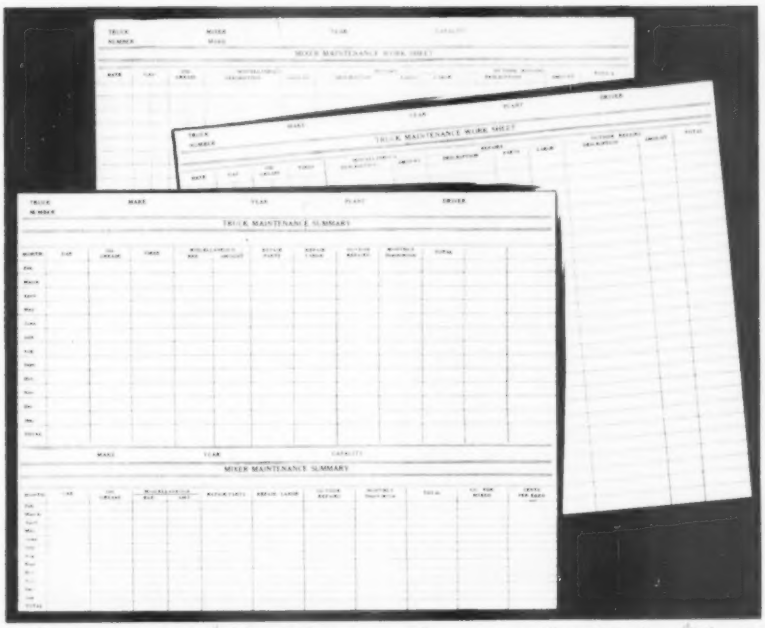
All trucks and mixers are painted a brilliant red and green and are kept spotlessly clean. They are sprayed each morning with a mixture of paraffin and fuel oil and washed down each night. Clean, attractive truck equipment is considered one of the most effective forms of advertising.

Policy is not to load beyond the mixer manufacturer's ratings, a practice which has been found to pay out in reduced maintenance costs over the long run. Where, nominally, a drum rated at 4½ cu. yd. capacity as a mixer, has a rating of 6 cu. yd. as an agitator, practice is not to exceed 5 cu. yd. Experience has proven that overloading results in excess wear on the mixing fins, tires and springs to the extent that the cost more than offsets any immediate advantages in carrying excess loads. Costly breakdowns due to the pulling of a rear end or axle when in soft ground have also been sharply reduced as a result. Mixers are depreciated in eight years and the engines are considered in need of replacement after four years.

Maintenance

The company has a well developed working program of preventive maintenance for both plants and truck fleets, excellent repair facilities consisting of a central repair shop at

Maintenance crew and emergency truck having every essential tool and welding equipment to get mixer trucks back into service



Truck and mixer maintenance forms. The two upper forms are monthly and the form, below, is a summary form

Price Hill and auxiliary shops at each plant, and carries a complete inventory of parts and supplies in stock. An accurate record system for parts and maintenance costs is maintained that is considered essential to singling out high maintenance truck units and equipment, and to the scheduling of a planned program to forestall breakdowns.

There is a regular crew of men assigned to handle maintenance work at the plants. The program for preventive maintenance starts on December 1 of each year when the plants are shut down in sequence for a complete going over. The men are then turned loose to reline chutes, replace weakened parts on bucket elevators, etc., and to repair any points of weakness that might cause breakdown before the next scheduled complete overhaul. In the interval between these scheduled overhauls, the manager of each plant is on the alert for trouble spots and it is his responsibility to detect the weaknesses as they develop so that they may be corrected before breakdown. There is a mechanic and helper on continuous duty at each plant and there are certain individuals assigned for scheduled inspection and lubrication. As set up, a major part of the responsibility for production is to anticipate potential breakdowns before they occur and take corrective action. A perpetual inventory is kept of replacement motors, sprockets, conveyor parts, shafts, screw flights and other parts vital to continued operation.

By having an adequate inventory

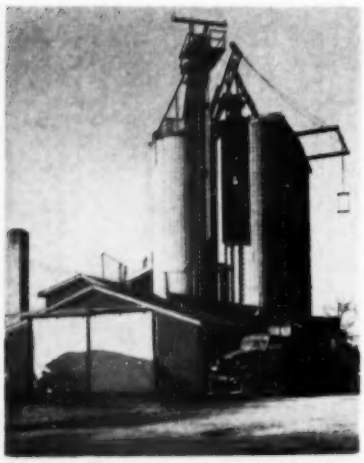
A program of preventive maintenance reduces breakdowns to a minimum

George Rieman, senior plant manager and new plant development

Edgar Pitzer, superintendent of fleet maintenance

George Koehler, manager, Plant No. 2

Swain Flinchpaugh, manager, Plant No. 4



Original Hilltop No. 2 plant at North College Hill, Cincinnati

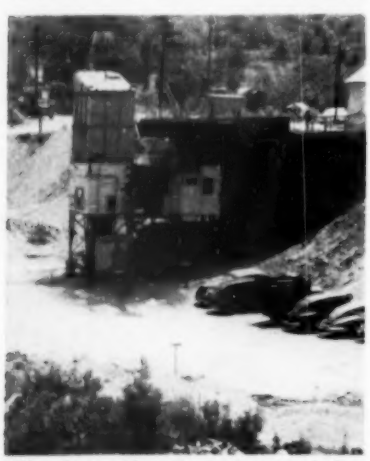
and a central repair shop equipped to do any normal heavy overhauling, major breakdowns can usually be repaired in a day and minor repairs be completed in an hour or two.

A *heavy inventory* of repair parts and replacements is also kept on hand for each truck unit and mixer, and nearly all of the general maintenance work is done in the company's own shop. In addition there are auxiliary repair garages at each plant for the ordinary run of repair work. Running records of every part of some 100 vehicles are maintained, as a guide to when a unit is due for overhauling or when any element is ready for replacement. Each truck is taken out of service once a month for a complete checkup on condition and needed repairs.

A perpetual inventory card is carried for each part, showing the quantity on hand, the vendor, price, date of issue for use, and it shows the consumption record for each month and the year.

A truck maintenance summary card is a continuous record of performance of each truck. The truck is identified by number, make, model year, plant and driver. Data recorded for each month include gasoline, oil and grease, tires, repair parts, repair labor, outside repairs, monthly depreciation and the total operating figure. On the same card is a mixer maintenance summary covering the same item but also including the cubic yards of concrete mixed and the total cost in cents per cu. yd. In addition there are monthly mixer and truck maintenance work sheets which list these cost items for each day and which are transferred to the summary cards.

Other forms are for incoming parts by plants, giving the amount, description, part number and source, and for outgoing parts giving the amount, description and application. A daily truck sheet has a record of the speedometer readings at the start and end of the day, the gasoline used by the truck and the mixer, oil consumption and miscellaneous items of cost. Each morning, the delivery equipment is sprayed with oil, the tires are checked and also the radiators, gasoline, oil, ammeters, temperature reading and the brakes. At the end of the day the entire unit is washed, the chute cleared of concrete, the tires checked and a report turned in if there have been mechanical difficulties developed during the day.



Hilltop-Dayton Plant No. 1, the original plant in Dayton, Ohio, utilizes gravity flow of materials with its hillside location

Belmont-Dayton plant which was completed in 1952

The preventive maintenance inspection sheet, for truck equipment, giving the date and truck number, covers every imaginable detail for the engine, chassis, cab, mixer or dump body and includes a road test.

This system of records provides an accurate check on the performance of all equipment and, in addition to being a guide to the scheduling of repairs, puts the finger on high cost units. For sometimes unexplainable reasons a particular mixer truck might habitually be a high cost unit when compared to others of the same age and the record would indicate that it should be replaced.

The company employs 12 mechanics and helpers. In addition to the repair garages it has a "machine shop on wheels" which is a truck equipped with workshop and repair parts that can be rushed to any plant or truck in need of quick repair.

Portable Mixing Equipment

Two 2-cu. yd. Mixermobiles are available for handling large concrete pours too far removed from the batching plants to justify the long haul in transit mixers and for use if the contractor desires. These units are fed dry-batched aggregates by dump truck near the construction site and cement may similarly be introduced or put, by bags, into the skip. The mixed concrete may be discharged into a transit mixer for a short haul or, if the Mixermobile is set up right on the jobsite, the concrete may be discharged into wheelbarrows or directly into the contractor's forms. The units have elevating towers which permit raising the concrete a height of 55 ft. in ½-cu. yd. buckets.

Usually, these units are reserved for jobs in the 3000-5000 cu. yd. size range or more up to a maximum of about 10,000 cu. yd. Under average conditions each might handle as much as 200 cu. yd. of concrete per day. The peak is 400 cu. yd. if the concrete need not be elevated. Main advantage to their use is that when set up to reduce the length of haul of transit mixers, only two trucks might be required as compared to ten if hauling concrete from one of the permanent batching plants.

Their second purpose is when a contractor requests their use to help him elevate concrete, in which case a modest premium is charged which is still to his cost advantage.

Laboratory

A great deal of the concrete in the Cincinnati area is specified on a strength basis with a range from 2000 p.s.i. to 5000 p.s.i. in increments of 500 p.s.i. This makes it desirable

Test cylinder being prepared after making a slump test of specially designed batch of concrete. Engineering Director A. F. Liggett, left, assisted by Lyman Beckett, manager of plant No. 3

to have facilities for control of quality and uniformity of product, not only for the purpose of putting out a high-grade product, but to take advantage of potential reductions in cost for both the customer and producer.

A new laboratory has been established at plant No. 3 which is equipped to perform all essential routine tests including the gradation of aggregates, slump determinations, the making of cylinders for compressive strength tests, and the determination of air entrainment in concrete. The laboratory was set up to supplement the work done in laboratories of customers and by independent laboratories, to check on aggregate sources and as a check on the quality of all concrete supplied customers who have no testing facilities. This is one of few companies, in our opinion, that has continuous supervision of its product by qualified technical personnel and thus is equipped to supply a concrete of uniform properties.

The director of engineering has an important function in the organization, including his participation in sales activities. It is his responsibility to instruct the weigh men at the several plants and to design various mixes of concrete, to interpret specifications for all concerned in the company, to maintain a consistent product and keep posted on all significant developments in concrete technology. He holds regular meetings with the weigh men for interchange of ideas and maintains comprehensive records of test data. He also conducts occasional meetings for the purpose of educating plant managers on engineering problems pertinent to weights and standards.

Among other activities, he keeps constant check on the accuracy of all weighing equipment, visiting each plant at least twice a month for this inspection and calibration.

He has modern testing equipment at his disposal including the relatively new Alpha moisture tester which utilizes the gas pressure developed by the free moisture in the aggregate to give a direct reading of moisture as a percentage of total weight. It requires less than a minute for this test so it is done often each day as a means for close control of slump, strength and workability of the concrete.

Merchandising

Hilltop is an aggressive merchandising organization, employing 11 outside salesmen for direct contacts and supporting the men in the field with appropriate advertising and direct mail sales promotion. Sales conferences are held weekly by Mr. Dittrich, whose staff is trained to give technical counsel and to follow through to see that a job is done properly. Director of engineering Liggett works very closely with sales, and capital is made of his laboratory testing and interpretation of technical developments.

All batching plants are equipped with front-end loaders to feed hoppers of aggregate elevators and trim stockpiles

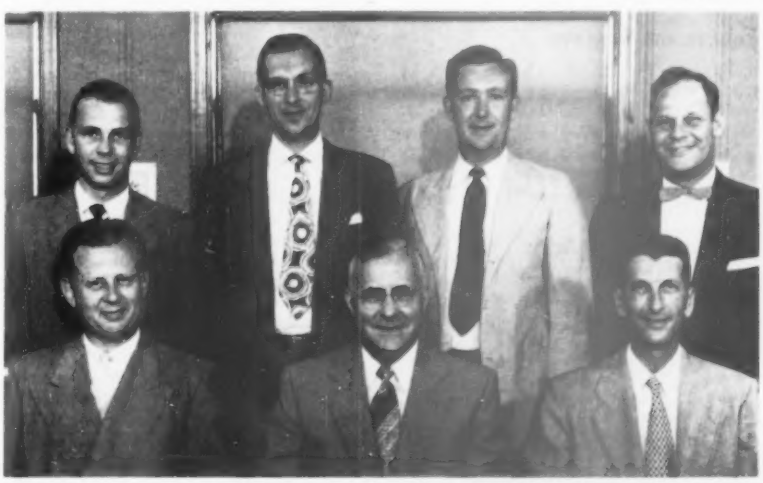
The company is aware that many home-owners do not know what concrete is, let alone appreciate its properties and the language of the industry, and has set out on a program of customer education. A direct mailing piece has been prepared on the subject of "slump" which is the first of a series of educational nature. The sheet shows by sketch just how a slump test is made and the measure taken. It goes on to show what slump means and its relationship to specifications to suit specific job conditions. It further invites those interested to come to the plant for a demonstration.

Advertising is considered very important and as requiring very close study in order to spend the advertising dollar wisely. Presently, the bulk of the advertising is carried in the form of display ads in the telephone directory and in building and loan association monthly magazines. Advantage is also taken of the company's being a dealer in gypsum products, by having its name imprinted on the covers of the home magazines of the leading gypsum manufacturers for distribution in the local area. Hilltop advertisements also appear in some of these issues.

Special mailing pieces are put out featuring new developments within the company of interest to the trade. A recent well illustrated folder featured plant No. 4 at the time production started. It described briefly the main features of plant operation, had a map showing its location with respect to the other three plants and emphasized that an adequate fleet of transit mixers had been assigned to serve that immediate area.

The brochure "The Story of Hilltop Service" was the outstanding mailing piece put out to date. It had good pictures of all the plants, gave the complete background of the company, showed portraits of all key personnel, had group pictures of the various crews of men and the office staff, described the laboratory and its func-

(Continued on page 158)



Sales staff of company. Seated, left to right: Edward Froehlich, assistant sales manager; Charles O. Dittrich, vice-president and sales manager; Arwood F. Liggett, concrete engineer. Standing, left to right: Clifford M. Sterratt; Bernard J. Wiechman; Irving W. Steele, Jr.; and Alvin C. Wert

NEW MACHINERY

Material Handler

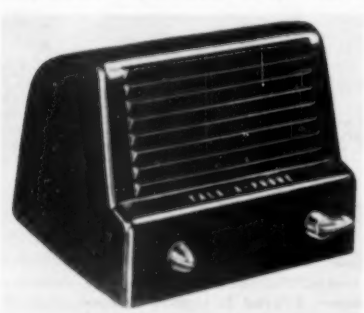
THE WILLIAM BROS BOILER & MANUFACTURING CO., Minneapolis 14, Minn., has introduced the "Magic Muscle," a truck-mounted material

Hoist with attached fork loads and unloads concrete block

handler with a loading or unloading capacity of 500 lb. The electrically-powered hoist travels the full length of the monorail boom mounted on the truck bed behind the cab, and a two-prong fork on the lifting column fits into block cores and pallets. The power source is a 110-volt a-c generator, driven by a gasoline engine. The one-man operated handler loads and unloads crates, barrels, drums, palletized materials, sacks, bales and boxes as well as concrete block. Cradles and scoops for other uses are available on the model. The handler fits truck or trailer bed lengths from 12 to 27 ft. A heavy-duty, all-steel bed is available at extra cost.

Intercom System

TALK-A-PHONE CO., 1512 S. Pulaski Rd., Chicago 2, Ill., has brought out model LC-33, a two-station intercommunication system which requires no wired installations, and can be plugged into any electrical outlet. The unit features the "Sonic Gate" which

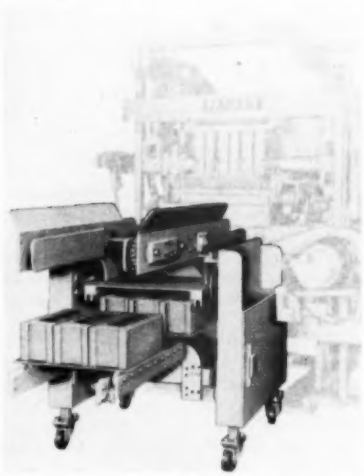


Two-station intercommunication system

is said to screen out hum and noises while the system is in operation as well as when it is in stand-by position. The unit is so designed that more stations may be added at any time, all receiving messages transmitted from any point. The model also features "Uni-Trans" which is designed to eliminate the need for operating controls while dictating or listening in.

Front Pallet Return

BERGEN MACHINE & TOOL CO., INC., Nutley, N. J., has announced production of a front pallet return which returns empty pallets above the outcoming block to prevent material from



Unit returns empty pallets above outcoming concrete block

broken block dropping on the pallet return mechanism. The return is attached to the block machine by a clamp, which is an integral part of the unit. Ball bearing casters support the unit so that it may be rolled away when changing a mold or for cleaning purposes. Installation of the front pallet return eliminates the complete pallet chain conveyor assembly. The unit operates on its own power, and is said to prevent jerking which causes cracked block. Pallets up to and including 19 x 27 in. may be used, and the return is adjustable for block heights from 3½ to 9½ in.

Fork Lift Truck

THE KNICKERBOCKER CO., Truck-Man Div., 650 Liberty St., Jackson, Mich., has introduced Model 40, a 2-ton capacity fork truck for use in outdoor storage yards as well as for transporting and stacking inside the plant. Features include a hydraulic side shift, oversized clutch, heavy-duty transmission and axles, hoses which run on pulley guides to prevent catch-

Two-ton capacity fork lift truck for inside or outdoor use

ing and tearing, high maneuverability due to a turning radius of 6 ft., and a governor which restricts the truck speed to 15 m.p.h. Pneumatic, 10-ply tires on the drive wheels and 8-ply rib pneumatic tires on the rear assure ample traction and footing. A 133-cu. in. displacement, 4-cyl., Ford industrial engine, which develops 40 brake hp., provides power for the fork truck. Attachments such as booms and shovels are also available.

Water Repellent

DOW CORNING CORP., Midland, Mich., has developed XS-1, a water-repellent solution for various materials including paper, asbestos, brick, concrete masonry and mortar. A solution of the sodium salts of certain silicones, the product may be diluted with water and applied by brush, spray, dip or by mixing with slurries. It may also be applied to soil and clay to reduce seepage into the ground and make water drain off more rapidly.

Diamond Blades

CLIPPER MANUEACTURING CO., 2800 Warwick, Kansas City 8, Mo., has introduced a diamond blade for cutting softer masonry materials, such as concrete block, pumice block, soft tiles, etc. Metal alloy bonds hold the diamond particles to the cutting edge of the blade, preventing the soft material from tearing the particles away.

Diamond blade cuts softer masonry materials

14. A producer views the ready-mixed concrete business . . .

IMPROVING YOUR SERVICE

By JAS. A. NICHOLSON*

THE SUCCESS of any ready-mixed concrete organization is largely dependent on its ability to consistently deliver, on time, a quality product to regular customers. Plant men should know that a reputation for giving service can only be earned through efficient, "trouble-free," operation. Drivers should realize that prompt, uninterrupted delivery service is the key to profitable, satisfactory relations with customers.

In any program to improve service, plant men and drivers must pull together as a team with top service personnel, the order-taker, the dispatch clerk and field representatives.

At the average ready-mixed concrete plant, performance results clearly show great weaknesses in order taking and dispatching. Personnel shortcomings, equipment deficiencies and "by gone" routines stifle the effectiveness of the order department and the dispatching office. At many operations, order-dispatching equipment and routines have remained unchanged through the years. Changes suggested by management are not put into effect. Order and dispatch personnel mentally resist most efforts to improve operating procedures. They do not come forth, on their own, with any well-conceived suggestions. These employes seemingly resent suggested improvements on the theory that their own work is being attacked. Apparently, such "behind time" personnel prefer to take the daily pummeling, which they get from angry customers, rather than put their houses in order.

*Pres., Nicholson Concrete Co., Toledo, Ohio.

At the average ready-mixed concrete operation, order and dispatch are missing; instead, we find disorder and delay. Such conditions are produced by confusion, carelessness, poor thinking and bad direction.

Order, dispatching and processing personnel are neither physically nor mentally alert. Avoidable mistakes are made in taking orders. Late deliveries regularly occur because of poor scheduling or over-readiness to make commitments. Jobs are held up because of unnecessary equipment breakdowns. There is a lack of coordination with plant operations. Deliveries are not synchronized with job unloading practices. The matter of delivery preference is handled on a "hit and miss" basis. Driver performance is not properly supervised. There is indefensible wrangling with customers.

The order-dispatching department is the nerve center of your operation. The order-taker and the dispatch clerk are key service personnel. They serve in a liaison capacity between you and the customer. Carefully select high caliber, energetic, loyal, mentally alert men for these all important positions. How efficient are your own order and dispatching procedures? How suitable are your present order methods? Have dispatching techniques been brought up to date? What can be done to improve both? Is personnel adequate? Have you enough depth? Enough ability? Are longer working hours indicated? Can work of individuals be rearranged to improve group performance? Are working conditions satisfactory? What equipment changes are necessary?

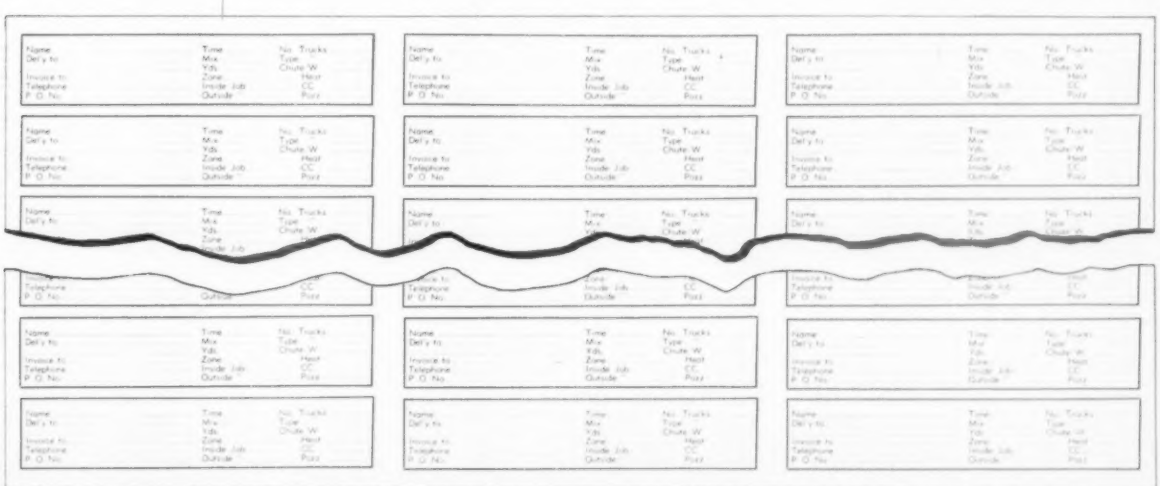
Routines should be developed that enable management to check up on the effectiveness of service personnel. Similar routines should be set up which permit the order-taker and dispatch clerk to check on their own work. If customer service is not what it should be, you had better get busy in providing adequate equipment, securing competent personnel and setting up effective routines.

Routines

From a telephone call with a customer must come necessary information so that concrete, of required quantity and quality, can be delivered at an agreed time to a specified address.

The full purpose of the customer's phone call is accomplished by the contractor getting his concrete, as he wants it, when he wants it. For performance to the customer's satisfaction, the order taker must get complete information and accurately record same. The dispatch clerk must carefully plan his delivery schedule. The plant must be in readiness. The truck mixer must be loaded on time, and the driver must make prompt, uninterrupted delivery to the exact address.

Sound routines must be established



Advance schedule board which is used in planning ready-mixed concrete deliveries a week in advance. It is 15- x 18-in. size

for taking orders, stopping errors in order taking and dispatching, giving key customers proper preference, keeping deliveries on schedule and for checking performance of plant-men, drivers and service personnel.

Our eldest son is somewhat proficient at water skiing. Among his accomplishments, while speeding down the waterway, is carrying a classmate on his shoulders. The two boys practiced on this stunt for a month—without success. Then, they hit on the right routines. Now, it's an easy trick. They've got it "down-pat." with the development of proper routines, your order and dispatching will begin to "hit on all fours."

An order department must be available to customers on a daily, fixed, accomodating basis. It is very important that customers should be urged to place orders well in advance of the time of desired delivery. It is also important that when a customer has been unable to place an order during the day, he should know where he can do so in the evening. The taking of an order should always be in competent, alert, ever-ready hands.

Customers should be advised that your company will only be responsible for deliveries arranged through regular order channels. Double handling, through salesmen or service representatives, should generally not be permitted. Drivers should not be allowed to take orders or to increase yardage on an order if such increase means that an extra trip or added trips will be required.

Each and every order should be properly taken. The necessary questions must always be asked. Accurate, complete answers must always be obtained. You have to know what, how, when and where; the kind and amount of concrete, consistency of the mix, time wanted and delivery address.

In taking orders, avoid the errors of similarly sounding words. In writing down the name of a customer, get the first name or initials. In taking the address, get the exact number on a given street and insist upon locating the delivery point between two streets or roads. Too many trucks are regularly being sent to similarly sounding streets in the wrong section of a city. Misdirecting a truck is an unpardonable sin. If any doubt exists, as to the accuracy of the delivery address or any other important item, contact the customer by phone or send a field agent to the job.

Some producers require additional pertinent information such as effect of weather upon delivery hauling zone and point of origin. The knowledge that given work is to proceed, even though rain is threatening or falling, is important information on bad days. At many plants, the price of concrete is based on the length of haul. At such plants, the writing down of the delivery zone is necessary for efficient billing. If several plants are operated by a producer, the order information should indicate the plant from which the concrete will be delivered. What is really important is that all required information be obtained accurately and completely on each and every order.

Whatever form your order sheet takes, these pertinent facts must be covered:

1. Correct name of customer.
2. Exact street address.
3. Mix design.
4. Admixtures, if required.
5. Yardage.
6. Time wanted.
7. Number of trucks.
8. Spacing between trucks.

On new orders, there is one question which should always be asked: "Whether inside or outside work is involved?". On outside work, it should be definitely understood that orders will be held up in case of inclement weather—rain, snow or sharp drop in temperature. When taking an order for inside work, effort should always be made to get the customer to accept the concrete, at the specified time, in spite of weather conditions.

Inside Work for Rainy Days

All regular contractor customers should be urged to always have some "rain work," (e.g. basement slabs) in readiness. The development of such a program assures savings for the contractor and money in the bank for the supplier of ready-mixed concrete.

There is another point to the "inside or outside work" question. A good percentage of our business is dependent on the weather. Full bookings generally disappear on the wings of a sudden downpour of rain. Fill-in orders are hurriedly needed. Fill-ins come, principally, from deferred inside orders. All service personnel should cooperate in lining up inside work, which will be ready to go whenever bad weather stops outside pours.

When taking an order, a commitment of delivery time must generally be made. Delivery promises must be governed by hard facts. The demands on equipment, importance of the customer, kind of work, time of receiving the order, length of haul and other important factors must be considered.

In making delivery commitments, the key customer's order should be preferred over that of the less important account. Other things being equal, the short haul and the fast job should be preferred over the long haul and the slow job; the order, placed in advance, over the order given on the day of delivery; and concrete which must be finished preferred over concrete for footers, foundations and walls.

If the demanded, or requested, time for delivery cannot be met, a commitment should be made for later in the same day or for a given hour on another day. Unless suitable delivery arrangements can be made, that are reasonably possible of fulfillment, the order should not be accepted. It is always better to lose an order than to offend with poor service.

A ready-mixed concrete operation can batch, pre-shrink, or central mix only so many cubic yards of concrete during a given period. It is foolish to make commitments that are in excess of capacity to process and deliver. To determine how many orders to accept, for a given hourly period, you have to know how much concrete your trucks can deliver. The latter primarily depends on the requirements of the orders which have been booked; on how long the trips take and on how quickly the loads can be discharged.

Controlling Delivery Commitments

At an individual plant, operations tend to average out with concrete deliveries more or less following a pattern. In a day's work, it can be reasonably expected that so many trucks will make a total of so many trips. There are only three sound ways of increasing the number of trips: (1) using additional trucks; (2) changing plant operations to put more trucks through during a given period, (e.g. changing from central mixing to shrink-mixing); and (3) lengthening the work-day: opening earlier in the morning, working during the noon-hour and staying open later in the afternoon.

To illustrate: In a fleet of 10 hauling units (each of 4-cu. yd. capacity), if it is determined that trips average an hour and a quarter running time, the daily delivery capacity will be 320 cu. yd., (80 trips of 4 cu. yd. each), in a 10-hr. day. As some partial loads must be handled, a slight adjustment downward should be made. In this particular case, an average day of 275 to 300 cu. yd. might be expected.

Every effort should be made to confine the expected shrinkage in hourly capacity to afternoon work at which time the strain on delivery equipment is generally somewhat reduced. This is done by giving preference, on morning deliveries, to work which can be handled within the average limits: to short hauls, full loads and fast jobs.

Using our illustration, the 10-unit fleet will deliver 160 cu. yd. in a 7:00 a.m. to 12:00 noon period. Only that much business should be accepted. If additional commitment must be made, the operating morning must be automatically lengthened; otherwise, the morning limit is 160 cu. yd. To say it differently, the fleet will handle 40 spaces of 4 cu. yd. each. During a morning period, the order taker has 40 spaces to fill or book. As trucks are dispatched in rounds, a commitment for morning delivery should be made for one or more of the 10 spaces in one or more of the four rounds.

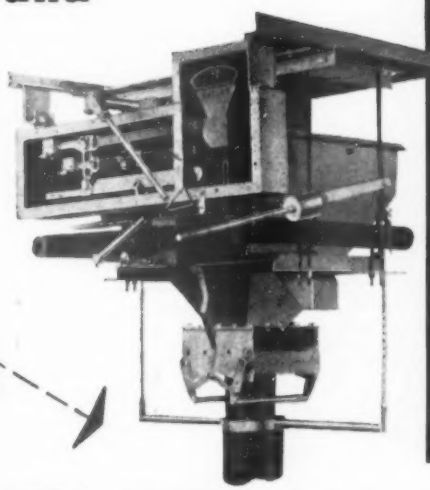
A commitment for a 7:00 a.m. delivery of 60 cu. yd. in five trucks, means the setting aside of 15 spaces: five spaces in each of the first three rounds. The acceptance of this order also means that one-half of the delivery equipment is booked solid for the first three rounds and that only

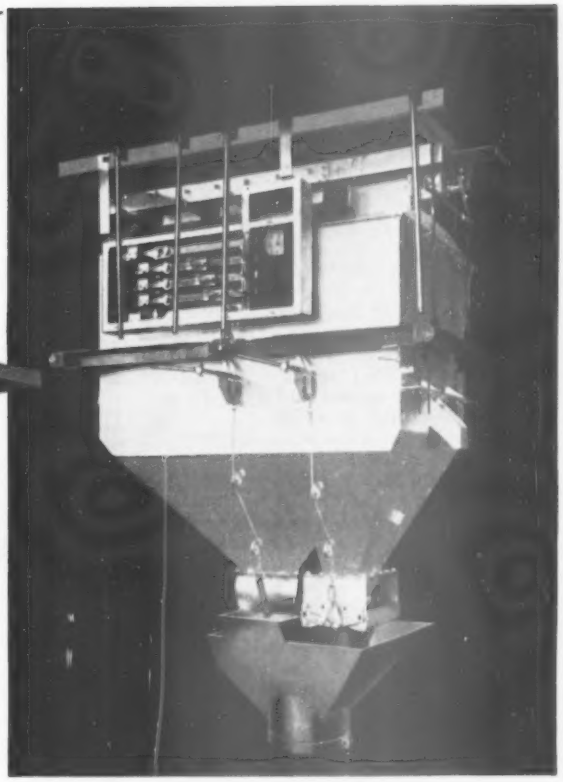
head,

heart and

hand

is the





BUTLER Weighing Batcher

Head? Yes, because whether it's for a Roadbuilders' Plant or an immense Central Mixing operation, a BUTLER Batcher is a fast-acting robot that virtually thinks for itself. The fully automatic, pushbutton units do *all* the thinking, faster and more accurately than a man.

Heart? Yes, because it's the BUTLER Batcher that keeps materials in smooth-flowing circulation with a pulse-like, never-failing regularity — batch after batch, month-in and month-out.

Hand? Yes, because a BUTLER Batcher "hands-out" batches to your trucks with split-pound accuracy and at a speed that keeps them humping to keep up.

So, whether you need a completely automatic, vastly complex, mistake-proof, push-button Batcher to weigh out as many as 8 materials . . . or a combination Batcher for cement and aggregate . . . or a Batcher for 3 aggregates . . . or fast-stepping, high production Batchers for your Roadbuilders' set-up — it's profitable and wise to insist on the BUTLER nameplate.

BUTLER Weighing Batchers are readily installed on any plant — regardless of make. So if your batching equipment is getting on the old and jaded side, give your plant a new and active head, heart and hand — a BUTLER Weighing Batcher — and watch your production soar.

BUTLER BIN COMPANY
993 Blackstone Avenue
WAUKESHA, WISCONSIN

25 morning spaces are left for the rest of the trade, (five spaces in each of the first three rounds and 10 spaces in the final morning round).

If a given delivery is expected to take 30 to 35 min., there develops a natural inclination to reserve only half a space. Before considering such reasoning, it should be made certain that other deliveries will be completed within the average limits. At times, sizable morning pours go relatively fast. Under such conditions, additional morning spaces can be reserved for other customers. If the scheduled 60-cu. yd. pour can be handled in the time allotted for completion of the first two rounds, then these five trucks will be available earlier and five additional spaces may be booked.

The booking of additional spaces, acting on the belief that some trucks will be available earlier than normally figured, is dangerous procedure. It is a move of last resort. Long experience teaches that while some deliveries may be speeded up, other jobs take longer than expected. The "average" pattern generally develops. Pressure to take on added trips must come from important accounts and the booking of these extra spaces should never be allowed to interfere with scheduled deliveries to key customers.

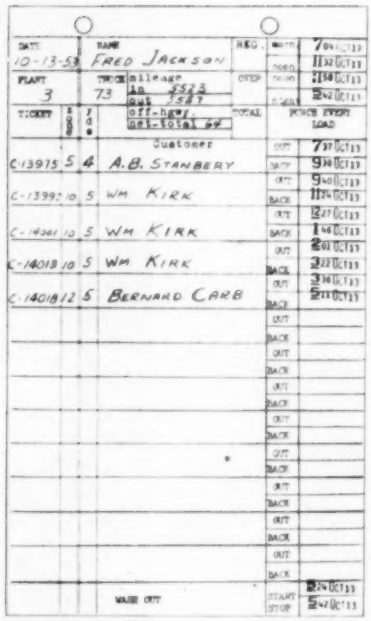
What would happen were you to go to a hotel for a reservation and you were to be told that your reserved room was already occupied and that no other room was available? Undoubtedly, you would let the world know what you thought of the hotel management. Yet, almost unconcernedly, many ready-mixed concrete producers daily over-commit their equipment. A customer of such a concrete producer is not only waiting for his reservation, but he is obligated to pay his job employes top wages whether or not the reserved truck puts in its appearance at the reserved time.

The making of honest commitments and the intelligent scheduling of deliveries are made possible through the effective use of an adequate schedule board. Such a board may be anything from a simple affair to a complicated instrument. Provision may be made for a single plant, a fleet of trucks working two or more plants, or for several truck fleets operating out of different plants.

Through the use of an adequate schedule board, a ready-mixed concrete company can keep its trucks on schedule, make deliveries on time and service jobs with the required number of trucks. Its use enables an order taker to intelligently plan each and every period of a working day. Fewer complaints are received. Employe morale goes up. Costs go down. Customer relations improve. In the hands of an efficient order taker, the schedule board is a modern effective tool.

Scheduling Week in Advance

During the busy season, work on which you have commitments should be scheduled a week in advance. An advance schedule board should be arranged for each day of the week with a special "operations" instrument to handle "today's" deliveries. At the conclusion of each day's work, tomorrow's deliveries are transferred to the "operations" board, which handles only "today's" orders. On this board, individual truck numbers are listed and spaces are reserved against individual trucks. If a given truck is garaged for repairs, spaces covering the anticipated "down-time" are marked "taken." As spaces for individual trucks are filled, available reservations are thereby reduced. When all the spaces are gone, that's it. When all reservations are booked, a railroad may run an extra car. When an important customer puts pressure on an operator to get delivery after all the spaces have been reserved, the only immediate answer is to work a longer day.


DATE 10-13-53 NAME FRED JACKSON REG. 7 37 Oct 13
TRUCK 73 Mileage 1a 4523 out 1947 TOTAL 11 24 Oct 13
PLANT 3 OVER 3 44 Oct 13
2 42 Oct 13
TICKET | S | T | d | off-hwy. | on-total hr | FINISH UNLOAD
Customer
C-13975 5 4 A.B. STANBERY OUT 7 37 Oct 13
BACK 9 34 Oct 13
C-13992 10 5 WM. KIRK OUT 9 40 Oct 13
BACK 11 24 Oct 13
C-14001 10 5 WM KIRK OUT 12 27 Oct 13
BACK 1 46 Oct 13
C-14018 10 5 WM KIRK OUT 2 01 Oct 13
BACK 3 22 Oct 13
C-14018 12 5 BERNARD CARB OUT 3 48 Oct 13
BACK 5 11 Oct 13
OUT
BACK
WAIT OUT START 2 24 Oct 13
STOP 5 42 Oct 13

Close check is kept on each mixer truck by using this form on which time of leaving and return for every delivery is recorded

Advance schedule boards handle tomorrow's deliveries and "later in the week" orders. On these boards, reservations are not made against individual trucks. Spaces are listed only for the total number of available trucks. Again using our 10-truck fleet illustration, on advance schedule boards, 80 spaces are available for each working day (40 spaces in both the morning and afternoon). As soon as big pours can be lined up, orders covering them are placed on that day's schedule. Daily orders of regular customers are listed as early as possible. After all the important work is scheduled, there are generally some spaces left on each day's board. From here on, commitments should be carefully made. The possibility of receiving "late" orders, from important customers, should be considered. If possible, 10 percent to 15 percent of the spaces should be reserved to handle such orders. In our 10-truck fleet illustration, eight spaces would be kept available until planned deliveries are transferred to "today's" operations board.

Advance orders from private individuals and relatively unimportant contractors should only be accepted for afternoon or Saturday delivery. At the end of each working day, with the transfer, by the order taker, of tomorrow's deliveries to the operations board, everything should be in readiness so that a ready-mixed concrete producer can live up to his delivery commitments.

Keep Deliveries on Schedule

Keeping deliveries on schedule is a problem general to our industry. This phase of the business must be vigilantly watched. Straight thinking is required. Daily checks should be made on performance. Each day, an operator should know about the number of deliveries made on time, deliveries made an hour (or more) late; job hold-ups due to improper spacing of trucks, orders cancelled because of delivery failures, loads returned or redirected because construction workers had already left the jobs, and other complaints received on service.

Even if the order department neither over-commits nor makes serious errors in taking orders, the scheduling of deliveries may get "all jammed up" and throw operations into a tailspin. A customer under orders, requiring additional trips (or spaces) to complete the work. Plants or trucks break down. Accidents occur. Partial loads are necessary. Cement does not arrive on time. Put several unexpected incidents together and you may be in trouble.

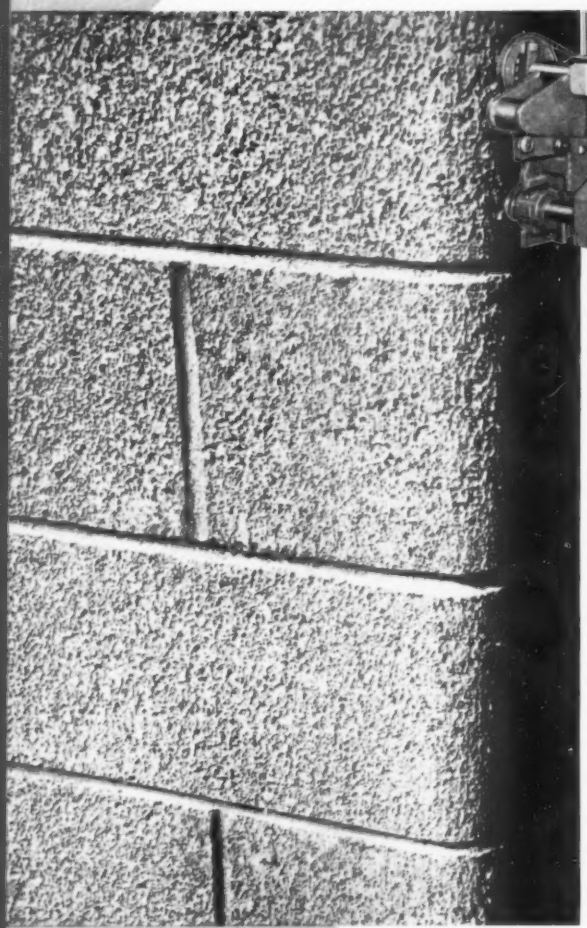
The first round each morning is all important. Upon it depends, to a great extent, the continuing goodwill of customers and the number of on-time deliveries handled at regular pay rates. On labor costs alone, the first hour is worth an hour and a half of the late afternoon. First round efficiency is necessary if you are going to live up to your delivery commitments. If recurring reports of late "first trips in the morning" are being made by regular customers, the dispatching office is not functioning properly.

If unfavorable reports on early morning service are being received, check the following: (1) dispatcher not qualified to handle this tough assignment; (2) dispatching personnel failing to arrange schedules in advance; (3) dispatching personnel not reporting sufficiently ahead of first morning starts; (4) too many first round orders taken; (5) plant-opening preparation taking too long; (6) plant personnel reporting late; (7) absenteeism; (8) drivers reporting late or slow in getting trucks started; (9) failure, the night before, to leave

BESSER VIBRAPAC

Fully Automatic... No Operator Required!

Front Pallet Feed Model.



Note the beautiful texture of this exposed concrete block wall. With a Besser Super Vibrapac, concrete masonry units can be controlled and varied in both texture and density, as required for soundproofing, acoustical correction and appearance of wall finish.

SETS THE PACE for High Production of Quality Block

Your profits depend largely on the uninterrupted production of high quality masonry units. The dependable Super Vibrapac produces block of exact height and uniform density on a continuous production line. Three 7⅝ x 7⅝ x 15⅝ (or equivalent in other sizes) modular high-quality block are made at a time on a Plain Pallet. No operator is required. From the charging operation to the completed block, it's a fast, continuous operation, fully automatic, including front feeding of pallets. The Vibrapac assures maximum block production at lowest possible cost.

BESSER MANUFACTURING CO.
COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS
ALPENA, MICHIGAN, U. S. A.

Send for FREE Bulletin Describing SOFFIT BLOCK

The bulletin shows you how to apply the practical advantages of Soffit floor and roof filler block. Your market potential and profit possibilities are greatly increased by furnishing Soffit Block for firesafe floors and roofs.

BESSER

BATCH MIXERS · SKIP LOADERS · BLOCK & BRICK CUBERS · SUPER VIBRAPAC · SINTERING PLANTS · ACROW CENTERS · ROOF TILE MACHINE

trucks and mixers in proper operating condition; and (10) early morning coffee drinking by drivers.

In the absence of unforeseen incidents, when acceptable routines have been followed, in making delivery commitments and in handling the first round, deliveries during the rest of the day should remain on schedule. If other causes produce late deliveries, the plant should be kept open during the noon-hour period and, if necessary, operated a longer day, on overtime, until all reserved deliveries have been completed.

Some customers should get top service all the time. Your best customers, in yardage, regularity of use and prompt payments, are entitled to preferred consideration. With them, you should lay the answer on the line; there must be no trafficing with the truth, and no promises should be made that cannot be fulfilled in your delivery arrangements. Take every precaution to minimize the number and degree of complaints received from key customers. Carefully pre-plan your service policy.

With a customer of the next classification in importance, there must be some adjustment. You simply cannot always give him concrete in the amount he wants and when he wants it. At times, this rated customer must be talked into using fewer trucks, taking delivery at a later hour or postponing shipment to another day. Deferred shipments should be made without, in any way, indicating that any other customers could conceivably be getting preferential service. Any poor service, given this customer, should later be rectified by a number of capably handled jobs.

On busy days, a lower rated customer, an "on and off" contractor or a private individual is liable to get an "awful kicking around." There is no sound economical method known whereby this customer classification can regularly be given efficient service during the busy season. If you are already operating efficiently, with your present equipment, the only cure for faulty service would be continued expansion. In most marketing areas, such expanson would be a completely unrealistic approach. In the ready-mixed concrete industry, seasonal fluctuations, high labor costs, small payloads and expensive delivery equipment prohibit gearing operations to handle peak demands.

To help you give service on "peak demand days," point out to regular customers how they can cooperate by: (1) placing orders in advance; (2) avoiding part-load deliveries; (3) planning their own work so that an order can be completed within a reserved number of trips; (4) requesting no more trucks than absolutely necessary; (5) referring unimportant work to a later day or to a later hour of the same day; (6) notifying dispatcher immediately in case of slow down or stoppage at their jobs; and (7) checking with the dispatcher before starting any work not covered by the order.

If additional concrete, beyond what has been ordered, is required to complete a job, insist that the customer phone or otherwise immediately contact the dispatching office. On busy days, the rendering of efficient service is impossible where you permit customers to tell your drivers to bring back another yard or another load. Today, the old story that no phone was available is a poor excuse. Neither you nor customers can afford the loss of time and money caused by this lack of cooperation.

When uncontrollable incidents force a slow down in either processing or

Date .....

The driver of this truck No. ..... in his judgment feels that damage to ..... may occur in the delivery and placing of this material where you desire it. It is our wish to help you in every way we can. In order to do this, we ask you to sign this release in which you agree not to hold the NICHOLSON CONCRETE COMPANY, or the driver of this truck responsible for any damage that may occur in the delivery of this material to the premises, sidewalk, or curb.

Signed .....

By .....

Release card which recipients of concrete are asked to sign when delivery conditions indicate damage may be done to premises

delivery operations, certain steps should be taken: (1) hold up all deliveries not already started; (2) proceed with critical work; stop all other jobs; (3) give preference to key customers; (4) transfer some work to other plants; (5) rent emergency equipment to keep going; (6) get competitor to load truck mixer; (7) move up noon-hour and attempt to complete required work, (causing down time) during shut-down period.

It is important that the key customer should be given preference. It is equally important that a routine be set up on relations within the service personnel as to who determines priorities on customer deliveries. A sound, realistic priority schedule should be the basis for all the tough decisions that order takers and dispatch clerks are forced to make. The schedule should include a rating as to credit, delivery preference, unloading time average, limit of trucks on busy days, sales calls and service attention.

On their delivery inquiries, customers should be promptly given carefully considered, dependable information. If deliveries are running late, customers should be advised when a load or loads can be expected. Such information should come only from service personnel. Salesmen should be kept out of this picture. Their interference generally leads only to misunderstanding and conflict.

To assure the greatest number of on-time deliveries, consideration should be given the following: (1) Is plant (or plants) ready to operate on schedule? (2) Are drivers at their posts on time with trucks ready for the road? (3) Have proper steps been taken to eliminate unnecessary downtime of plant and delivery equipment? (4) Is contractor's cooperation being sought in using fewer trucks and eliminating extra loads? (5) Is concrete to be finished being delivered in the morning? (6) Is concrete for footers and walls being scheduled for afternoon delivery? (7) Are long hauls and slow pours being deferred until after the noon-hour? (8) In the busy season, are deliveries to private individuals being made in the latter part of the afternoon or on Saturday? (9) Whenever possible, are you handling several part-load orders in one delivery? (10) If overbooked, are you opening at an earlier hour? (11) If behind schedule, are you working through the noon period and staying open until orders are completed?

Failure to keep deliveries on schedule can be caused by added part loads, to clean up jobs; extra trips as a result of under-ordering; poor unloading practices by contractors; too many trucks being used on same jobs and too many trucks being operated out of the same plant. The matter of added loads requires the contractor's full cooperation. He must be made to realize that calling for extra trips completely disrupts delivery schedules and practically destroys service efficiency. On a busy day, work of a habitually offending contractor should be avoided or, when taken, should be held within the specified order. Near the end of every multiple-trip order, drivers should be required to check to make certain that the original specified yardage and the reserved number of trips will complete the job.

Driver cooperation is always essential in keeping deliveries on schedule. Necessary repairs must be promptly reported and, whenever possible, completed before the garage closes for the day. (Many operators find that the use of a "night" mechanic helps greatly to assure efficient first-round deliveries.) Drivers must immediately report unfavorable job conditions, under-ordering, over-ordering, slow-ups, work stoppage, poor access, etc. Before taking their lunch period, drivers should first check with the dispatch office. When drivers do as they please, there can be no control over deliveries.

With driver's cooperation, the major control problem of truck stopping, (coffee drinking etc.) is eliminated. Ralph Anderson of Columbus, Ohio, and I credit Lew Hubbard of Cleveland Builder's Supply Company, Cleveland, Ohio, for suggesting a routine to control truck stopping. At our Toledo operations, we use a combination daily log and time card. A driver is required to note, on the back side of this card, each unauthorized stop that he makes. We don't tell him that he can't make a stop. We do tell him that he must report each and every stop. The making of reports tends to impress upon the driver the seri-

(Continued on page 162)

"...more than **4 years and 36,541 cubic yards** of concrete later..."

Left: Western's first Challenge 5 Yard Mixer

Roy Walton (facing camera), President of Western Concrete & Equipment Company, Los Angeles, watches his first Challenge Mixer operating at peak efficiency, discharging the 36,541st cubic yard of concrete.

This was the first of 40 Challenge Mixers purchased by Western Concrete & Equipment Company. According to Mr. Walton, it has been operated continuously ever since it was purchased in September, 1949, carrying an average of 175 cubic yards of concrete per week.* **"Now," says Mr. Walton, "more than 4 years and 36,541 cubic yards of concrete later, the drum has never been relined, nor does it look as though it will need relining for a long time to come. The only expense we have had on our entire fleet of 40 Challenge Mixers has been normal maintenance and service. And that, by the way, is far less than for our other make mixers."**

Here is "proof positive" that CHALLENGE also sets the standard for extra long, dependable drum life!

CHALLENGE TRUCK MIXERS

QUALITY STANDARD OF THE INDUSTRY

**In many communities, conditions do not allow this heavy volume of continuous operation. Actually in some areas, this yardage represents 6 to 8 years mixer life.*

Get the complete story of Challenge . . . made in 3, 3½, 4, 5, 6, 6½ cubic yard sizes. Use the return coupon for the name and address of your nearest Challenge dealer.

Cook Bros. Equipment Co., CP

Please send name and address of my nearest Challenge Dealer, together with catalog showing complete line of Challenge Mixers.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

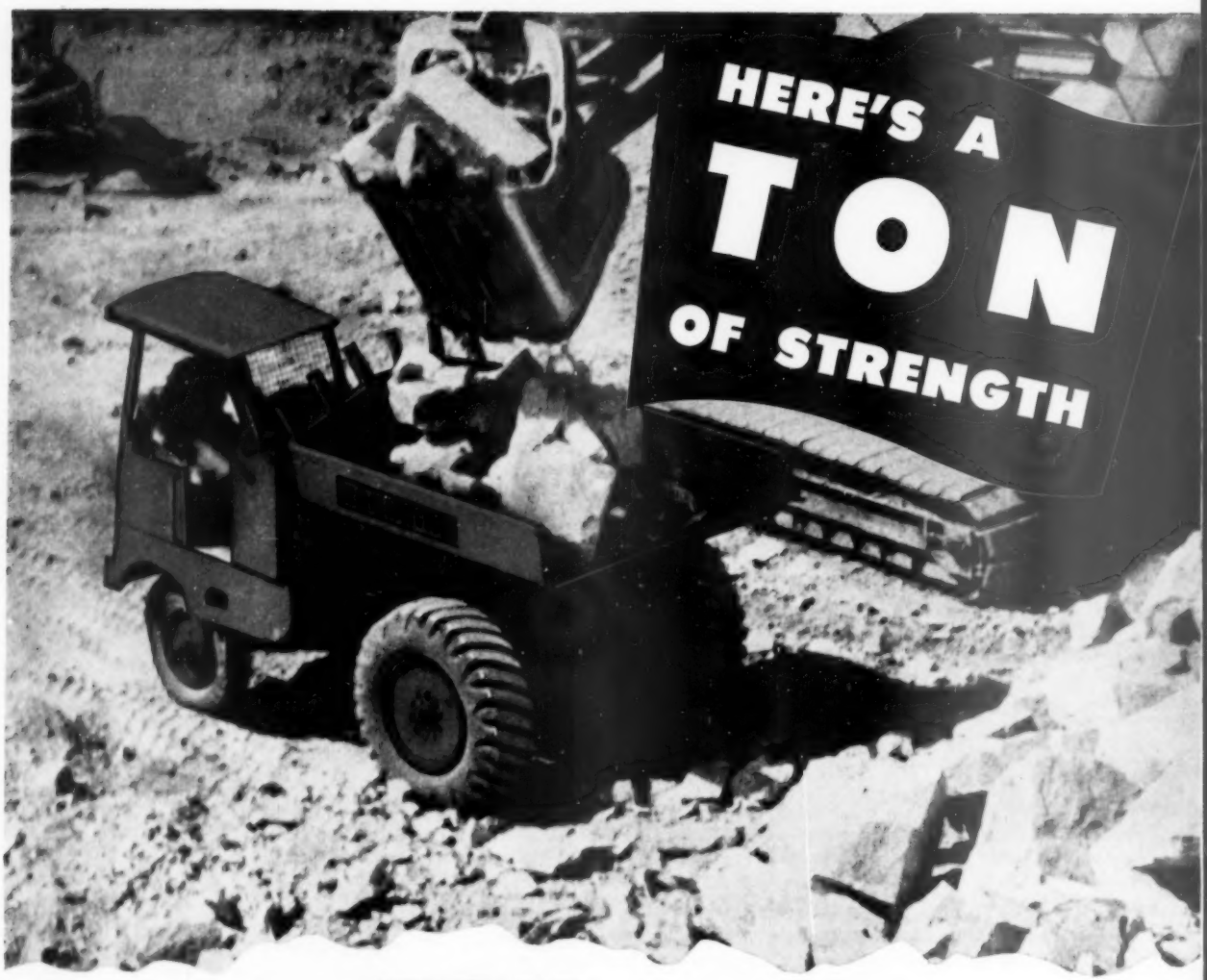
COOK BROS. EQUIPMENT COMPANY

3334 San Fernando Road, Cleveland 6-3151

Los Angeles 65, California

Exclusive National Distributor For CHALLENGE TRUCK MIXERS *Standard of The Industry*

MEMBER N. R. M. C. A.



FOR EVERY TON OF PAYLOAD . . .

When you're loading 1½ to 2½ yards of rock at a pass, hauling units need plenty of strength to last. With Koehring heavy-duty Dumptors, you have a ton of net vehicle weight for every ton of payload capacity. Sides, ends and bottom of all-welded 6-yard body are heavily reinforced with 4" channel ribs. Triple strength steel-oak-steel bottom cushions shocks of rock loading. Free swinging kick-out pan adds another tough steel plate to Dumptor bottom for extra strength.

There's plenty of strength, too, in the Dumptor chassis to take the constant pounding of heavy loading and rough off-road hauling. Heavily-trussed 8" ship channels make up the main frame. 4" chrome steel drive axles are protected by heavy-cast one-piece steel housing. "I"-beam steering axle is cast alloy steel. There are no leaf springs — just one big double-coil chassis spring on the steering axle — none on drive axle. Big drive tires eliminate need for more springs, absorb loading and hauling shocks, save spring maintenance.

Even with this heavy-duty construction, Koehring Dumptors have 6 HP per ton of gross weight — accelerate fast, pull through soft ground and up grades with less shifting — climb 24% grades fully loaded. For less down-time, more work-time, put heavy-duty Dumptors on your jobs.

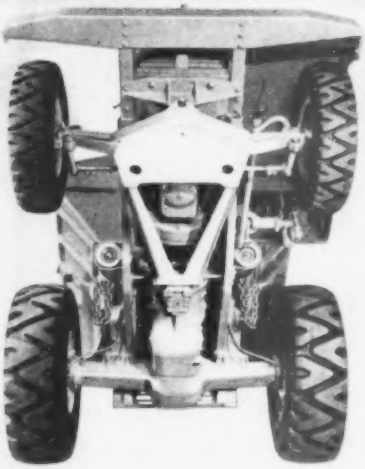
CK339

KOEHRING HEAVY DUTY

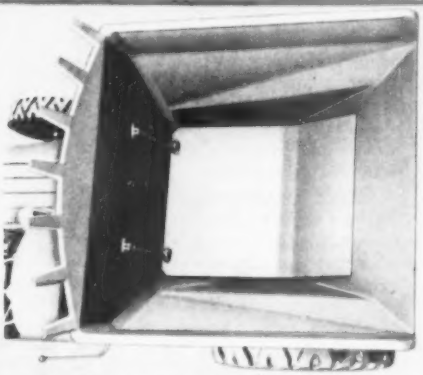
SEE YOUR KOEHRING DISTRIBUTOR FOR COMPLETE FACTS

KOEHRING DUMPTOR®

KOEHRING COMPANY, MILWAUKEE 16, WIS. • SUBSIDIARIES: • KWIK-MIX • PARSONS • JOHNSON



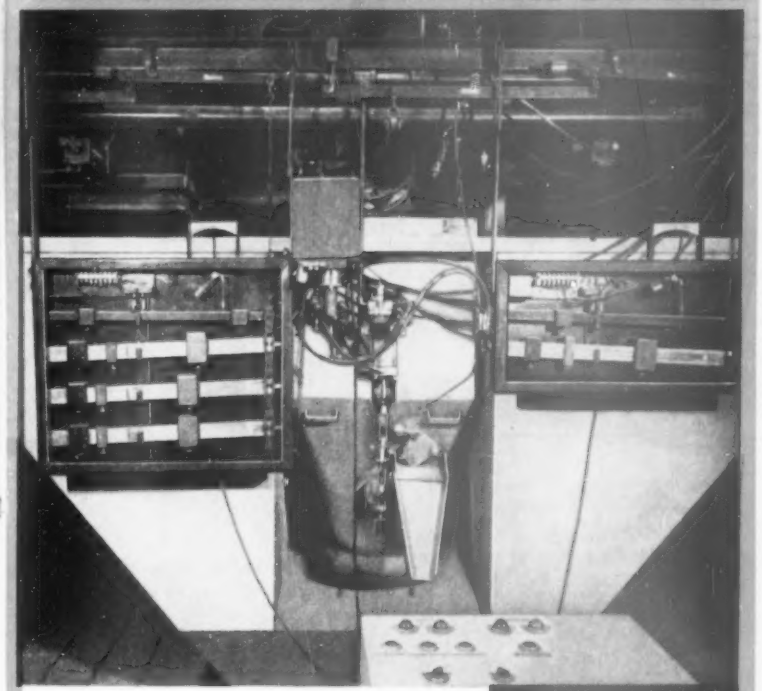
NO "SOFT SPOT" on Dumptor's underside . . . 1-piece, cast steel housing protects drive axle and enclosed chain drive. Wishbone supports the skid plate . . . shields the radius rod and the engine crank case . . . and supports the oscillating steering axle.



KICK-OUT PAN adds an extra 3/16" high-manganese steel plate on top of sturdy Dumptor bottom . . . breaks suction of sticky materials for fast, clean dump. Big 8' x 8' top gives easy-to-hit target for fast loading over the side or end . . . with less spillage.

1-SECOND GRAVITY DUMP . . . no slow-acting body hoists . . . no body-hoist maintenance . . . plus same speeds forward and reverse for no-turn shuttle hauling keep production yardage high, costs low with Dumptors.

CENTRAL CEMENT FEED with Johnson Concentric Batcher



● Central cement feed with Johnson Concentric Aggregate-Cement Batcher prevents "gumming", reduces dusting, pre-shrinks materials. All ingredients are intermingled as they flow through discharge.

● Cement, concrete's most expensive ingredient, is weighed individually on precision-beam scale in a separate batcher hung within the aggregate hopper. Aggregates are weighed on accumulative dial scale, or on individual weigh-beam scales.

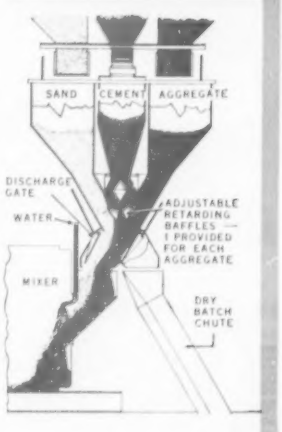
● Adjustable rate of discharge of each aggregate permits accurate ribbon-feeding . . . cement flow cuts off just ahead of final weight, prevents overshooting.

● Dual discharge is available for charging 2 stationary mixers, or 1 stationary mixer and a truck mixer or dry-batch truck.

● 2 to 5 cu. yd. sizes can be arranged for 2 to 4 aggregates, plus 1 or 2 types of cement . . . have fully-automatic, semi-automatic or manual controls. Let your Johnson distributor show you all the production advantages you will get with one of these patented Concentric Batchers in your plant.

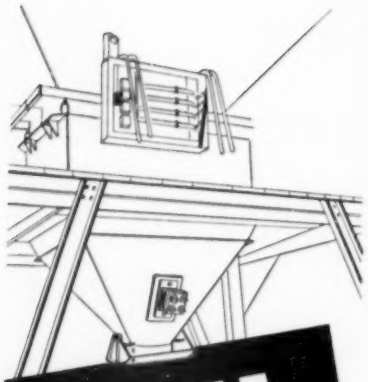
Automatic
AIR-RAM OPERATED

Finger-tip panel controls air rams on aggregate and cement fill valves and discharge openings . . . provides fully automatic operation . . . assures extreme accuracy at top batching speeds. Batcher also can be furnished with semi-automatic or manual controls.



JOHNSON KNOW-HOW PRODUCT

C. S. JOHNSON COMPANY
(Koehring Subsidiary) CHAMPAIGN, ILLINOIS U.S.A.
CONCRETE PLANTS • BINS • HOPPERS • ELEVATORS • SILOS • BUCKETS



BIN STUCK LATELY?

Concrete products processing plants everywhere have found CLEVELAND air vibrators the solution to their arching, bridging and sticking problems.

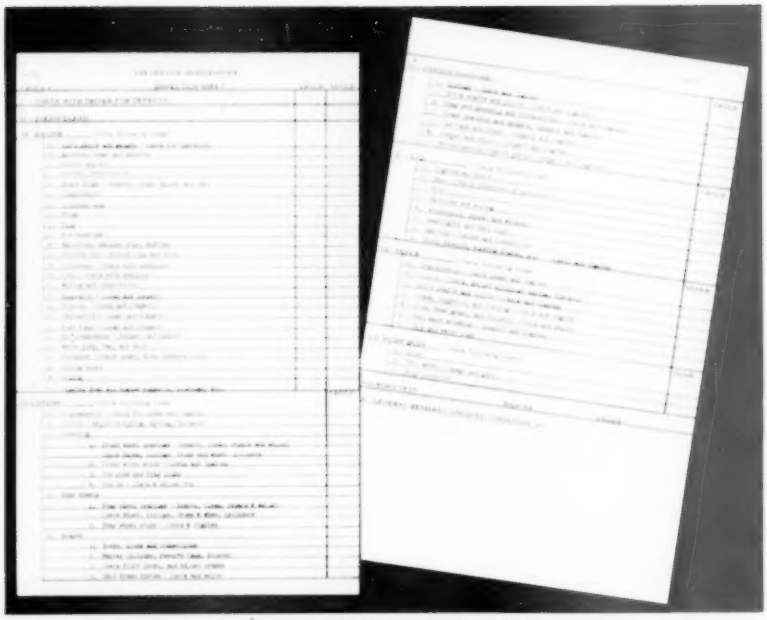
With a CLEVELAND, materials move through handling devices efficiently and economically, thus cutting down production time and costs.

We have a size and type, either quiet or standard, to fit your requirements.

Write for our new catalog No. 109.

THE CLEVELAND VIBRATOR COMPANY

2712 Clinton Ave. • Cleveland 13, Ohio



Preventive maintenance inspection sheets used by mechanics

Hilltop

(Continued from page 147)

tions, illustrated some of the outstanding projects using Hilltop concrete, showed the plant locations projected on a map of Greater Cincinnati and covered the safety program, the sales organization, maintenance and equipment. It not only served to acquaint readers with the company but gave deserved recognition to the personnel responsible for carrying through the Hilltop policies which we think was an excellent job in employe relations. This booklet contained 40 pages within green covers bound by red ribbon —red and green are the truck fleet colors. It was concisely written and carried a foreword by President Steele.

Service is emphasized in all advertising and direct mail and the slogan "Your Phone Starts a Truck" has been adopted for much of it. President Steele is personally very active in the promotional stages of the overall merchandising program.

Among miscellaneous items given out by the sales department are pencils, carpenters' aprons, rulers, slide rules for calculating concrete quantities and many others.

(Continued on page 160)

Right: Mixermobile unit serves as a batcher for mixer trucks at remote locations

Left: Elevating concrete at a building reconstruction job

YOUR ONLY SOURCE FOR THESE "COMPLETE PACKAGE" ADVANTAGES FOR READY-MIX OPERATIONS

ONE SOURCE RESPONSIBILITY

All your equipment comes from one responsible manufacturer, on one order and in one shipment. In dealing with one source, you can be sure of undivided attention to your problems and interest in the successful performance of your equipment.

ONE SOURCE FOR SERVICE AND PARTS

You have a nearby source of replacement parts and prompt, efficient maintenance service from one dependable distributor organization. One Blaw-Knox trained man can service all your equipment, give *preventive* maintenance to your "Complete Blaw-Knox Package".

ONE SOURCE FOR ALL YOUR EQUIPMENT

The Blaw-Knox "Complete Package" contains every piece of equipment you need for profitable ready-mix operations. Whatever type of work you do, there's a combination of Blaw-Knox equipment in a "package" tailor-made for your requirements and with the flexibility to handle many other applications where the same equipment can be profitably used.

ONE FINANCIAL ARRANGEMENT

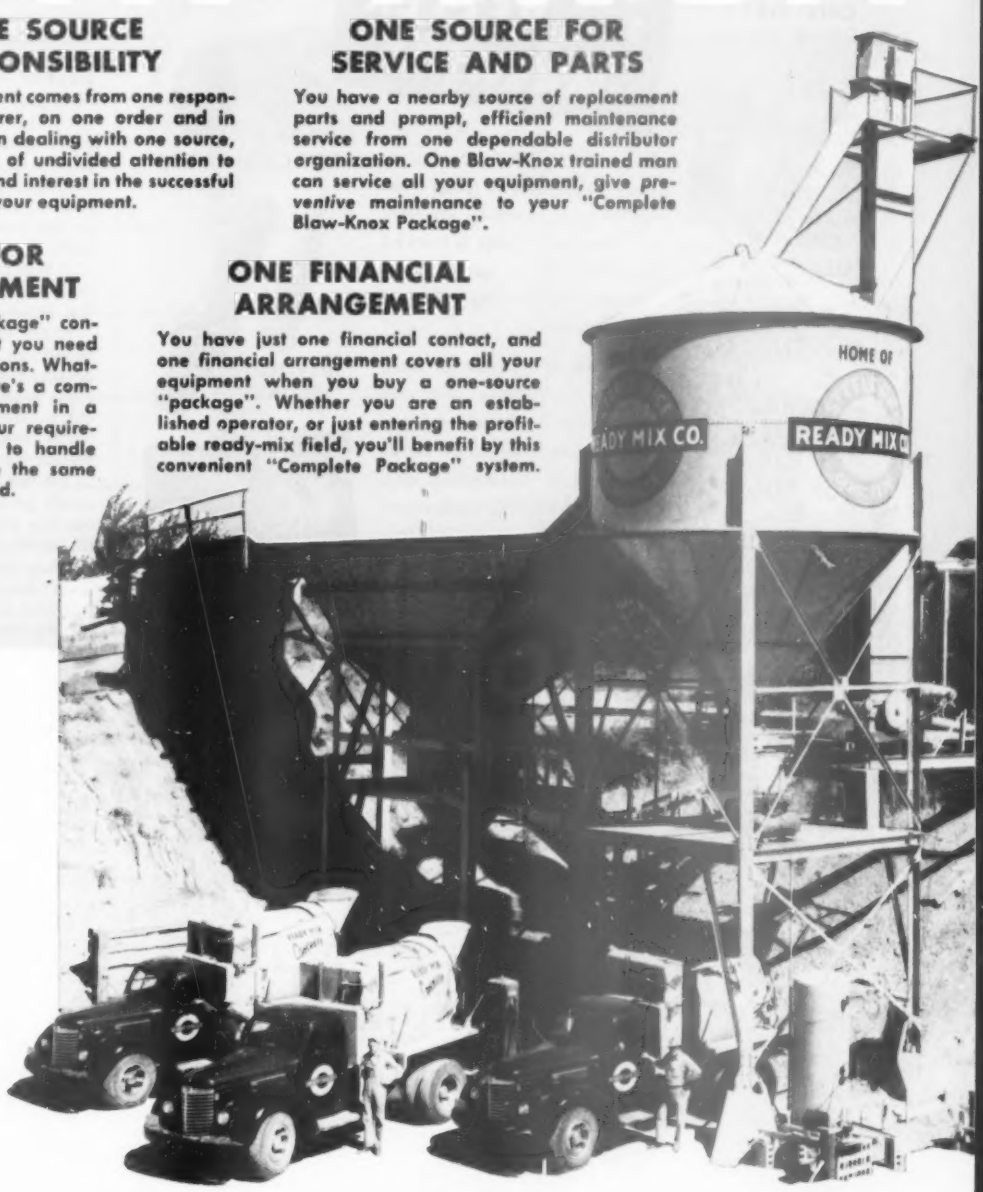
You have just one financial contact, and one financial arrangement covers all your equipment when you buy a one-source "package". Whether you are an established operator, or just entering the profitable ready-mix field, you'll benefit by this convenient "Complete Package" system.

TRUCK MIXER LOADING PLANTS

Complete one-stop plants for loading truck mixers of all sizes and types with accurately measured quantities of aggregate and cement. Bins may be compartmented to suit your needs.

CLAMSHELL BUCKETS

Blaw-Knox Clamshell Buckets are available in a wide range of sizes, weights and types for every material handling, hard digging or general purpose requirement.



AGGREGATE BATCHING PLANTS

For fast, accurate batching. Portable for easy moving. Self-cleaning bins, equipped with automatic, semi-automatic or manual weighing batchers, are available in 2-, 3- and 4-compartment styles, in capacities from 100 to 120 tons.

HI-BOY TRUKMIXERS

As the lightest-weight heavy-duty complete truck mixer available, the Hi-Boy saves time and money by hauling bigger pay loads at lower cost per yard.

BULK CEMENT PLANTS

Cut the cost of handling large volumes of cement. Storage bins and weighing batchers can be supplied in any type or style for your requirements. 200- and 400-bbl. sizes available, with combination arrangements which double these capacities.

BLAW-KNOX

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Farmers Bank Building
PITTSBURGH 22, PA.
Offices in Principal Cities

GET BLAW-KNOX "COMPLETE PACKAGE" ADVANTAGES

for every concrete highway or airport paving job. The Blaw-Knox "Complete Paving Package" includes Steel Road Forms, Clamshell Buckets, Aggregate and Cement Batching Plants, Subgraders, MultiFoote Concrete Pavers, Spreaders and Finishing Machines. See your Blaw-Knox distributor for details.

10 Reasons Why UNIT is a BETTER MACHINE
ONE-PIECE GEAR CASE
DISC CLUTCHES
DROP-FORGED PARTS
FULL VISION CAB
UNIT is the ONLY machine on the market with all these time-tested, outstanding features . . . and every one is backed by more than a quarter century of engineering skill and craftsmanship.
Compare UNIT, part for part, feature for feature, with any other crane or shovel, and you will realize why UNIT leads the field in excavating and material handling equipment.
Why not investigate what UNIT can do for you? Get the complete story — write today for free booklet "10 Reasons Why UNIT Is A Better Machine."
INVOLUTE SPLINES
TWIN HOOK-ROLLERS
HEAT TREATING
AUTOMATIC TRACTION BRAKES
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6431 W BURNHAM STREET
MILWAUKEE 14, WIS., U. S. A.
STRAIGHT IN LINE MOUNTING
WORM DRIVE
Available in Crawler and Mobile Models . . . ½ and ¾ yard Excavators . . . Cranes up to 20 tons lifting capacities . . . Fully convertible to all attachments.
UNIT
UNIT 1020 — ¾ Yard Shovel for tough digging. Fast and easy on the swing.
UNIT 1520 — Heavy Duty Self-propelled Mobile Crane. Capacity up to 20 tons.
SHOVEL
DRAG
CLAM
HOE
CRANE
MAGNET
All Models Convertible to ALL Attachments!

Safety-Training

A clearly defined safety program is part of an overall objective to build and maintain sound public relations. The safety and personnel director conducts a monthly safety meeting for drivers. These meetings are often addressed by prominent safety authorities and features various forms of entertainment such as movies. A safety competition is sponsored and substantial cash awards are presented each year to the teams and individuals with the best safety records. An employe committee inspects the condition of trucks, mechanically and from the standpoint of cleanliness, for the purpose of the competition and also rules on accidents and places the responsibility for blame. A system of plusses and minuses based on inspections and accidents is the means of accumulating point totals in the competition.

Safe driving pins are awarded based on years of driving without accident, and a driver becomes eligible for a diamond pin after 10 years without accident. The accident record has been greatly improved since the emphasis on safety.

All new drivers are presented a small booklet "You and Hilltop," welcoming them into the organization. It is cleverly done and explains what a driver should do when confronted with doubtful situations out on the job and outlines his obligations as to his equipment and responsibilities to the customer. The company does not have any written agreements governing overtime charges if the customer holds trucks unnecessarily long but gives the driver the authority to refuse deliveries in doubtful cases.

The booklet also outlines policies with respect to seniority, overtime payments, paid vacations, explains compensation laws and outlines available hospital benefits and other matters of interest. It concludes with some brief facts about concrete and points up the problem of adding water with the sentence "Hilltop Delivers Good Concrete; please don't ruin it with water."

Dayton Operations

Hilltop-Dayton, Inc., is headed by John Steele, vice-president and general manager. Robert Roth is production manager; George Rieman is in charge of plant development; and Irving W. Steele, Jr. is secretary. No. 5 plant at Dayton was acquired when the company was organized. It is a gravity-fed plant located in a worked-out gravel deposit. A bulk cement set-up was added and production capacity has been increased to 600 cu. yd. per day. Ernest Vickers is manager of the plant.

The new Belmont plant has a belt conveyor and a bucket elevator which can be used interchangeably to put aggregates into the bins. It is a single-stop plant with a capacity of 800 cu. yd. per day. Frank Doran is plant manager.

Look how D-40 helps produce better, stronger Concrete Blocks

Sharper corners and edges

Increased plasticity improves handling with less breakage

Better appearance—smoother texture, whiter color

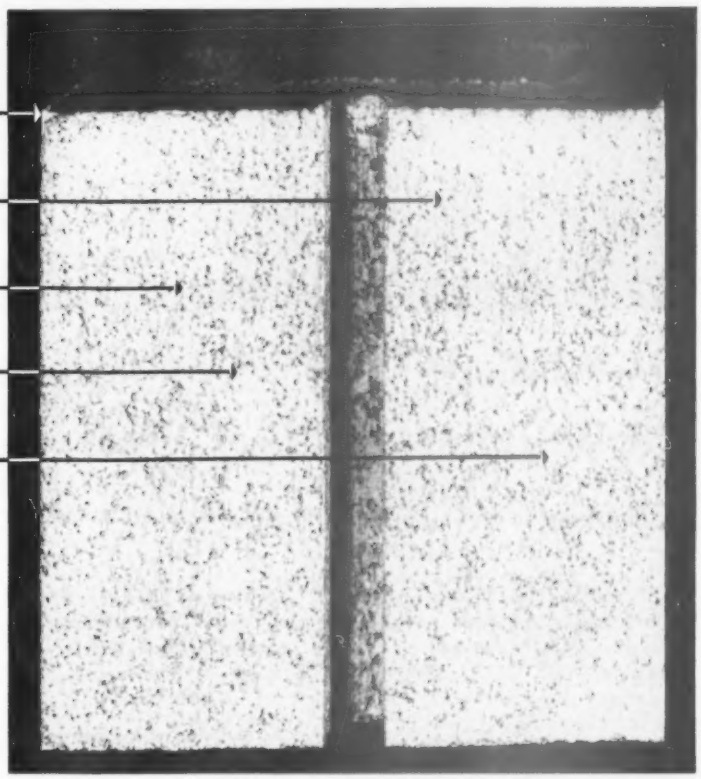
Greater strength due to decrease in water content

Closer bonding—saves on painting and waterproofing

D-40 reduces abrasive wear on mixing and molding equipment

D-40 saves time—mixes pour into molds faster—"break" cleaner

Economical D-40 costs you a fraction of a cent per block



(Block made with D-40. Note the fine texture, color and appearance—the sharp edges and corners)

You will be amazed at the outstanding results obtained by adding one to two ounces of dry, granular D-40 per bag of cement at the mixer. D-40 is a ready-to-use additive supplied in economical 85# bags by Oronite, the world's largest producer of synthetic detergent raw materials.

Let us show you how we have helped other concrete products manufacturers make superior products and at the same time reduce their operating costs. Our experience is at your disposal.

ORONITE CHEMICAL COMPANY

THE NAME TO WATCH IN CHEMICALS

2824

Ready-mixed concrete producers have found D-40 improves their product

For complete information, samples and technical help write or call the Oronite office nearest you

ORONITE CHEMICAL COMPANY

38 SANSOME STREET, SAN FRANCISCO 4, CALIFORNIA
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MERCANTILE SECURITIES BUILDING, DALLAS 1, TEXAS

CLARK UTILITRUCS handle the toughest jobs at least cost!

...they're engineered to satisfy driver, maintenance man, management

Here are the most advanced 6000-7000 lb. fork trucks on the market today—Clark's gas or electric UTILITRUCS. Built to handle jobs that break the backs of less rugged trucks, these UTILITRUCS have proved their superiority in foundries, steel mills, stevedoring* and heavy warehousing. They represent an ideal balance of essential engineering features. They get more work done at less cost, for these reasons:

1. Easier to drive

All controls at the driver's fingertips, like an automobile; compact and more maneuverable; shockless steering; increased braking efficiency; 140 sq. inches additional visibility; 25 inches of free-lift; DYNATORK or HYDRATORK DRIVE available on gas model.

2. Easier to service

Complete accessibility for maintenance. On gas model: one-piece "zipper" hood folds back to expose engine; one-piece floorboard lifts up to expose master cylinder and transmission; swing-out battery. All service points easy to reach.

3. Built to take punishment

Welded, integral-unit box frame eliminates distortion; higher inch-pound rating; axle-to-frame mounting absorbs shocks and strains; new design wheel and backing plate seals out dirt and abrasives. Oil bath air cleaner and oil filter standard on gas model. Totally-enclosed drive motor, sealed-for-life bearings on electric model.

We invite you to compare the UTILITRUCS to any 6000-7000 lb. truck on the market! Without obligation, you can discuss them with your nearby Clark dealer, listed in the Yellow Pages of your phone book. Or write us for free descriptive literature.

*Special stevedoring model available

1953 CLARK EQUIPMENT

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 60, Michigan

Improving Service

(Continued from page 154)

ousness of the effect of truck stopping upon delivery costs and customer service. Sales representatives, service men and I report, to the timekeeper, all truck stops that we see during the day. Log cards are checked daily to see if these stops have been reported. A failure to report an unauthorized stop puts the driver on the spot.

The many problems of delivery service require constant attention. Dispatch clerks continually try to remedy bad situations on their own until conditions get completely out of hand. Insist upon three "musts": (1) that key customers and more important jobs are given preference; (2) that customers, whose work is held up, are notified so that they can protect themselves; and (3) that daily reports are made of all delays in service.

Organization is the heart, and preference is the conscience of a good customer service policy. Only through the use of effective routines can such a policy be realized.

Note: A few fortunate ready-mixed concrete producers are now using radio in controlling deliveries of concrete. The importance of radio, to the ready-mixed concrete industry, will be discussed in a later article.

E.S.I. Meeting

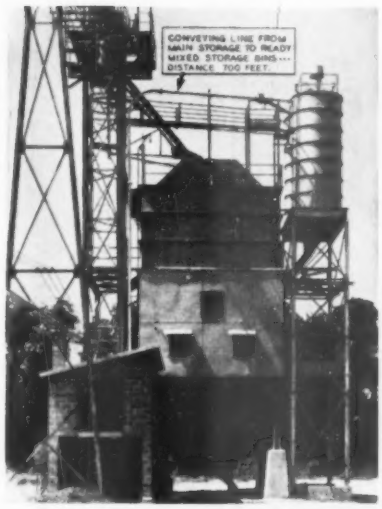
(Continued from page 159)

States and Canada for the express purpose of furnishing the technical information so much needed by us all.

"I have been interested for many years in the use of expanded shale and have had an opportunity to be associated on many large projects where large volumes of expanded shale were very successfully used.

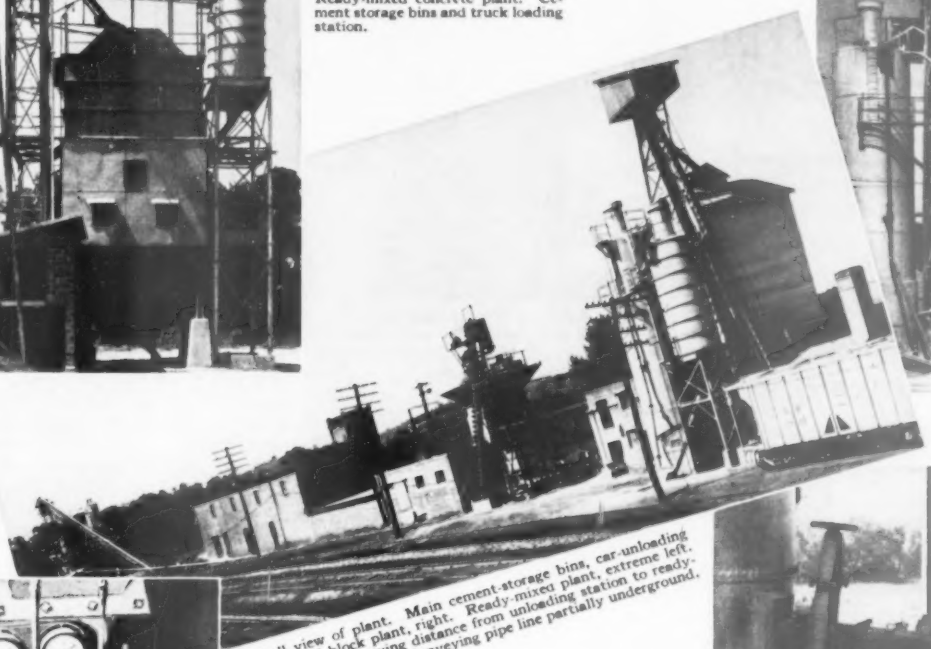
"While we were designing the Tacoma Narrows bridge, which carried a Haydite deck its entire length, the City of Tacoma decided to replace the old plank and asphalt floor on the Eleventh St. bridge in that city, and if possible, to build it of concrete without overstressing the bridge. We designed a lightweight expanded shale concrete floor with no wearing surface whatever. This bridge has a daily traffic of from 35,000 to 40,000 cars and trucks. The bridge itself was built in 1912, but the lightweight deck was placed in 1945. The eight intervening years have disclosed no defects whatever except for an isolated section about 2 sq. yd. in area which was slightly damaged by excessive rains at the time it was laid. No further damage can be detected. . . . At first I was somewhat skeptical about eliminating the wearing surface, but having witnessed the excellent performance of Haydite concrete without any additional wearing surface I am now a firm advocate of a one-course lightweight concrete pavement. . . . Also, you will find that by using a lightweight concrete on spans of from 300 ft. or more you will save from 5 to 25 percent in steel.

(Continued on page 164)



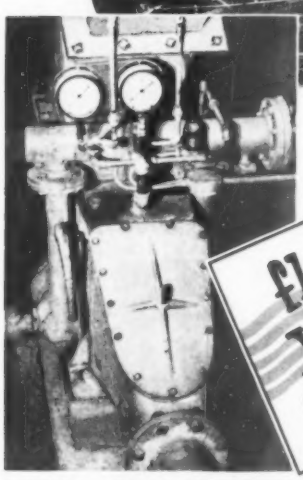
Ready-mixed concrete plant. Cement storage bins and truck loading station.

Main cement-storage bins, conveying line from Fuller-Kinyon Pump in pit underneath tracks.



Overall view of plant. Main cement-storage bins, car-unloading station, and block plant, right. Ready-mixed plant, extreme left. Approximate conveying distance from unloading station to ready-mixed plant, 700 feet. Conveying pipe line partially underground.

F-H Airslide for delivery of cement from storage bin to weigh scale over mixer in plant.



Fuller-Kinyon Pump in pit underneath tracks. Delivers cement to either main storage bins or to ready-mixed plant.

flow your cement

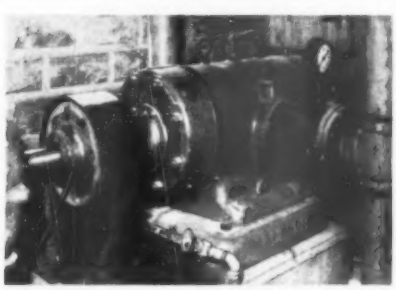
like Central Builders does with Fuller-Kinyon System *and* F-H Airslides

Central Builders Supply Co., Sunbury, Pa., operating both block and ready-mixed plants at one location, represents one of the most efficient plant layouts in the East, due to its centralization of bulk-cement handling. This was made possible through the use of the Fuller-Kinyon Conveying System and F-H Airslides . . . safe, clean, economical distribution of cement used in the manufacture of its products.

Incoming cement, received in hopper-bottom cement cars, is delivered to a Fuller-Kinyon Stationary Pump located in a pit underneath the railroad tracks. From this point cement is elevated vertically, through dust-tight pipe lines, to two main storage bins, or by the use of a two-way valve in the conveying line, direct to the ready-mixed plant, a distance of approximately 700 feet. Cement can also be reclaimed from these storage bins and conveyed, by the same Pump, to the ready-mixed plant.

Reclaiming from the large bin is accomplished by using two individual Airslides. One Airslide conveys from an overflow cone, installed in the top section of the bin, to a weigh batcher in the block plant. The second Airslide, located in the bottom of the bin, delivers to the Pump, for conveying to the ready-mixed plant. Cement is spouted by gravity from the smaller bin to the Pump.

Fuller-Kinyon Systems and F-H Airslides have many advantages for the conveying of dry, pulverized materials. If you handle such materials it will be worth your while to learn about Fuller air-conveying systems. Write us today!



Fuller Rotary Single-stage Compressor which furnishes air for the Fuller-Kinyon System. Capacity 526 c.f.m., 28-lb. pressure.

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DRY MATERIAL CONVEYING SYSTEMS AND COOLERS • • • COMPRESSORS AND VACUUM PUMPS • • • FEEDERS AND ASSOCIATED EQUIPMENT

Your Customers will say...

when you offer them a choice of

23

DIFFERENT CEMENT & MORTAR COLORS

Made by Williams, this is the broadest selection of fine Cement and Mortar colors on the market. By offering your customers a choice of 23 shades, you can quickly and easily settle upon one having the exact chemical and physical properties your color specification requires.

CEMENT COLORS BY WILLIAMS

Here you have a choice of 18 shades—6 Reds, 3 Greens, 3 Browns, 3 Yellows, 1 Black, 1 Blue, and 1 Orange. Each shade is manufactured to meet the most exacting specifications for cement work—as recommended by the American Concrete Institute and the Portland Cement Association.

MORTAR COLORS BY WILLIAMS

Here you have a choice of 5 different shades—one shade in double strength red, light buff, dark buff, chocolate and black. Each of these colors may be used with excellent results with any standard mortar mix or with a ready-made Bricklayer's Cement.

Write today for color samples and complete technical information on how Williams Cement and Mortar Colors give you superior results. Address Dept. 10, C. K. Williams & Co., Easton, Pennsylvania.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.
East St. Louis, Ill. Easton, Pa. Emeryville, Cal.

Taking time out for a friendly chat are, left to right: A. R. Waters, treasurer of the Expanded Shale Institute and president of Carter-Waters Corp., Kansas City, Mo.; Carleton G. Smithwick, secretary-treasurer, Smithwick Concrete Products, Portland, Ore.; and Emmett V. Poston, Poston Brick and Concrete Products Co., Springfield, Ill.

E.S.I. Meeting

(Continued from page 162)

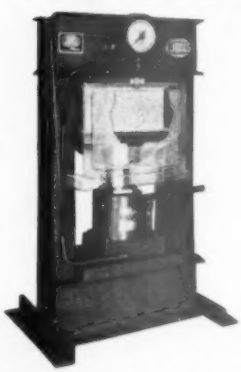
"It is my understanding that Ralph Tudor, of the Tudor Engineering Co., San Francisco, has designed the bridge spanning the Columbia River at The Dalles, which is now under construction. The deck of that bridge is also of Haydite with no wearing surface whatever. The Dalles bridge as well as the Tacoma Narrows bridge, has specified a cement content of eight sacks per cu. yd. This could be reduced, for we do have cylinders taken from the Tacoma Narrows bridge floor tested at one year which were running over 8000 p.s.i. in compressive strength.

"During the second World War, I was connected with the Bel-Air Ship Builders in San Francisco in the construction of some 24 concrete ships, each about 365 ft. long with molded decks with beams around 70 to 80 ft. It was essential that the payload be kept as high as possible and the dead load as low as possible, so a lightweight aggregate was specified. The thickest walls in those ships were but 6 in., many of the side walls were as low as 5 in., and in one or two places around the keel the thickness was 7 in. The specifications also stated that if any cylinder in any part of the hull should test below 5000 p.s.i. in 28 days it would be cause for the rejection of the entire ship. All ship walls were vibrated with miniature vibrators. Much to our relief and happy surprise we had no trouble whatever in getting a 5000-lb. concrete in 28 days; in fact, we had some cylinders reach it long before the 28-day period. We had year-old tests that ran over 10,000 p.s.i. compressive strength.

Permeability

"Now, as to permeability of this concrete, which is very important on nearly any project, but assumes critical importance in the construction of ships. The distance from deck to keel was 38 ft. The specifications required that we test each hold with a stand pipe 10 ft. higher than the deck, fill the hold full of water and also the pipe, which meant, of course, that the pipe created the maximum head, and was therefore a head of around 48 ft. at the bottom. We had to let this water stay there for 48 hr. and in the interim, if there was any sign of moisture on the outside of the hull, something had to be done about it. In all of those hulls, some 24 or 25, there were only one or two small spots of moisture visible on the

Jones COMPRESSION TESTING MACHINE



for more economical mixes, and uniformly higher strength

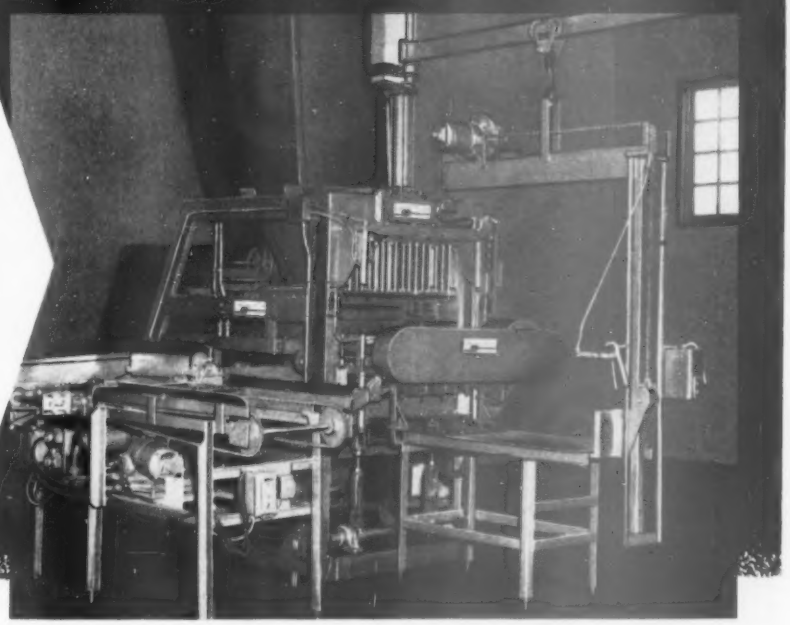
By doing your own testing of concrete blocks and cylinders, you will immediately discover anything which may have gone wrong with the aggregate, grading, mixing, etc. This will help you maintain more uniform quality and develop more economical mixes. The Jones (formerly Yoder) testing machine is low in first cost, specially designed for concrete products plants.

Send for list of satisfied users and literature.

***J. A. Jones* CONCRETE MACHINERY**
108 Horning Road, Pittsburgh 34, Pennsylvania

why plunge excess capital into YOUR plant?

Buy the new FLEMING FMC-400 and SAVE the difference!



Only FLEMING *gives you all these features . . .*

LOW COST—HIGH QUALITY . . . The FMC-400 is a champion in quality, dependability, low maintenance, superior production. Yet it sells for *less* than any other comparable machine available. Why? Because Fleming sells *direct to you*. Distributors' profits are passed along to you in the form of savings.

COMBINES PRESSURE HEAD WITH HIGH SPEED VIBRATION . . . FMC-400 combines pressure with high speed vibration to give uniform compactness throughout the block. Vibrating shafts are enclosed in steel tubes, rotate in oil bath. This assures long life, reduces maintenance.

ONLY ONE MAN REQUIRED . . . The FMC-400 operates *automatically* . . . without manual manipulation of controls. A one man operation, it frees labor to do other jobs, helps hold down your overhead, results in higher profits per unit, *day in and day out!*

PLAIN PALLETS FED FROM EITHER SIDE . . . By utilizing a simple roller-type conveyor, plain steel pallets may be fed from either side of machine. *Pallets are automatically cleaned and oiled as they are fed into the machine.* Pallets are 18″ x 22″, enabling the operator to produce five 4″ masonry units, two 10″ units, in addition to other standard multiples on the Fleming FMC-400.

POSITIVE HEIGHT & DENSITY CONTROL . . . Four contact points on each side of the head pressure attachment *must* contact four corresponding contacts on the other side before the FMC-400 microswitches will operate, thus assuring positive height control. Automatic adjustment control allows operator to adapt FMC-400 to moisture content of concrete and to types of aggregates selected.

Mail this coupon today!

FLEMING MANUFACTURING CO.

Complete concrete block plant equipment

187 Fleming Ave. • Cuba, Missouri

FLEMING MANUFACTURING COMPANY

Please rush specifications and prices on the Fleming FMC-400 fully automatic double-block machine to me immediately. I would also like information on the following products:

☐ COMPLETE BLOCK PLANT LAYOUT (no charge)

☐ FMC-180 Automatic Block Machine	☐ FMC-24 Mixer (2 sack)	☐ FMC-24D Mixer (3 sack)
☐ FMC-12 Mixer (1 sack)	☐ Lift Trucks	☐ FMC-36 Mixer (4 sack)
☐ Skip Hoists	☐ Racks	☐ Elevators
	☐ Material Hoppers	

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PRESENTING A GREAT NEW CONCEPT
IN FORK LIFT TRUCK OPERATION...

✓ HYDRAULICALLY CONTROLLED POWER
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From the first name in Mass Handling Equipment comes the last word in torque drives for fork lift truck applications. Here is a product of intensive research and engineering, truly a trouble-free torque converter drive . . . available to match the capacity range of all Towmotor power plants. Here is the one drive that adds still more to superior Towmotor performance. For the complete story in a nutshell, send for book on TowmoTorque now.

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TOWMOTOR CORPORATION,
Div. 4911, 1226 E. 152nd St.,
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TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

outside, which was quite a test for permeability."

Mr. Andrews closed his speech with a suggestion to the institute members that they further pursue a study on freezing and thawing effects, and frost resistance of lightweight concrete. He said that although he had no supporting laboratory data, it seemed a reasonable assumption to believe that freezing would have less effect on lightweight concrete than on other types of concrete.

New Block-Glazing Method

THE BURNS AND RUSSELL CO., Baltimore, Md., has announced the development of an improved low-temperature glazing compound for lightweight block. The product, Cermac Type B-35, is formulated to glaze in live steam. Conventional block plant steam-curing facilities are said to be adequate for the average glazing operation, using either a boiler or a steam generator. A temperature between 205 and 220 deg. F. at atmospheric pressure, for one hour, is all that is required to complete the glazing cycle. A small kiln separate from the regular block production can be installed, or a small section of the regular block-curing kiln may be walled off for the glazing operation.

Other advantages claimed for the new glazing process include: Elimination of the need for using only bone-dry block; no preheating or predrying; reduction in plant and equipment costs; and an improved nonglare, glazed finish, which may be produced in ten colors.

The machinery unit, designed for the mixing, de-airing and extruding of the glazing slurry into the casting molds, utilizes a chain conveyor on a continuous basis. The space requirement for the preparation of the block for glazing is 700 to 1000 sq. ft. Existing floor space in a storage area, warehouse, or other shelter is said to be suitable, with the only other requirements being a concrete floor and adequate ventilation.

Regarding the base block to be glazed, the usual high-grade, lightweight aggregates are said to be satisfactory, and all block, in addition to passing A.S.T.M. specifications as minimum requirements, must have close face dimensional tolerance in order to fit into the die-stamped casting molds.

Five companies, operating under the Burns and Russell license, are now producing "Spectro-Glaze" tile face units on a commercial basis.

Expands Block Plant

MILLER BROS. CONCRETE BLOCK AND MATERIAL CO., Macomb, Ill., which has expanded operations three times since its establishment in 1948, is currently undergoing a fourth addition to its plant, comprising a 160- x 17½-ft. steam-curing room. The company produces approximately 8000 block per day.

SMITH-MOBILE

New De Luxe MODEL

Best Buy..Here's Why:

- Completely Redesigned for Greater Efficiency than Ever Before
- Better Weight Distribution Allows Bigger Legal Payloads
- Gross Weight Cut Nearly 800 lbs.
- Overall Length Much Shorter
- Most Accessible Engine on Any Truck Mixer
- Two-Speed Transmission Built to Aircraft Specifications
- No Increase in Price, in Spite of Greatly Increased Quality

Note handy location of mixer engine. Every working part is easily accessible.

You Add Them Up...They Equal

The BEST TRUCK MIXER

You Can Buy Today!

SMITH — The T. L. SMITH CO. MILWAUKEE U.S.A.

THE T. L. SMITH COMPANY

2885 North 32nd Street • Milwaukee 45, Wisconsin, U. S. A.

Affiliated with ESSICK MANUFACTURING CO., Los Angeles, Calif.

CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH

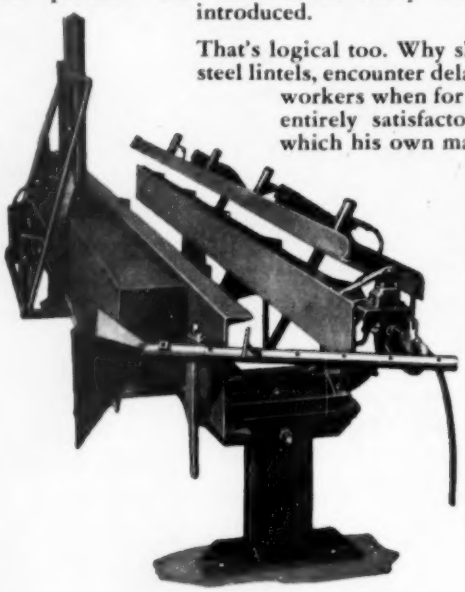
NEXT IN IMPORTANCE TO YOUR BLOCK MACHINE

Assuming that your mixer and block machine are working smoothly to your entire satisfaction, a logical question is what you can do next to increase your volume of sales.

One sound step in this direction will be to make concrete lintels and sills. Some producers have made them by slow, hand methods in more or less crude forms. But today, more and more concrete producers are making them better, faster, at less cost on the

KENT LINTELATOR

This is a highly efficient machine, the only one available for the purpose, which combines vibration and pressure to make superior products that have found ready acceptance wherever introduced.



That's logical too. Why should a builder use steel lintels, encounter delays and engage steel workers when for less cost he can get entirely satisfactory concrete lintels which his own masons can install.

There's something timely for you to consider. And if there is any question as to the efficiency of your mixing and block making equipment, the logical thing to do is investigate KENT Continuous Mixers and the KENT Blockmaker also.

Write today!

•

The **KENT MACHINE COMPANY**

CUYAHOGA FALLS, OHIO

Manufacturers of

CONCRETE PRODUCTS MACHINERY SINCE 1925

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Concrete Pipe Outlook

THE AMERICAN CONCRETE PIPE ASSOCIATION, in a recent monthly news letter to association members, stated that business in general in the concrete pipe industry is running about 8 percent above that of last year, as indicated by sales of mesh. It was pointed out, however, that in a few local areas concrete pipe sales have declined somewhat. It was also pointed out that competition with competing materials, especially wrinkled tin, has also increased. With steel now in abundant supply, the wrinked tin industry is out to regain lost business, with the result that some concrete pipe companies are finding it necessary to step up local promotion and sales efforts. Howard F. Peckworth, managing director of the association, predicts that the concrete pipe sales for the second six months of 1953 will remain about the same as for the first six months, but his predictions for the distant future are less optimistic.

Opens Prestressed Plant

MIDWEST PRESTRESSED CONCRETE Co., Springfield, Ill., recently organized, has started production of prestressed concrete beams for construction of highway bridges. The company is producing the beams under a franchise arrangement with Concrete Products Co. of America, Philadelphia, Penn. Officers of the new company are W. A. Russell, president; Don F. Childs, vice-president; G. M. Neff, vice-president; J. F. Stephan, vice-president; W. A. Neff, treasurer; and Jacob O. Whitlock, secretary and general manager.

•

The attractive and substantial concrete cribbing wall shown below supplied by Universal Concrete Pipe Co.'s Nashville, Tenn., plant, has been installed on the old "W" road leading to the summit of Signal Mountain, Tenn. The wall was designed by Schmidt Engineering Co. and installed by Brown Bros. Construction Co.

N.C.M.A. Research

THE NATIONAL CONCRETE MASONRY ASSOCIATION has announced the establishment of a research grant at Iowa State College to carry on a program of laboratory research on two major projects.

The object of the first project is to determine quantitatively the adhesion of mortar to concrete masonry units; the effect thereon of selected variables; and the possible correlation between bond and certain measurable properties of the mortar and concrete.

The object of the second project is to determine the flexural properties of concrete masonry walls supported at the ends, and with the transverse load transmitted horizontally to the end supports.

The investigations were planned by R. E. Copeland, director of engineering, N.C.M.A., and are being conducted by Prof. A. R. Livingston, under the general supervision of Prof. H. J. Gilkey, both of Iowa State College.

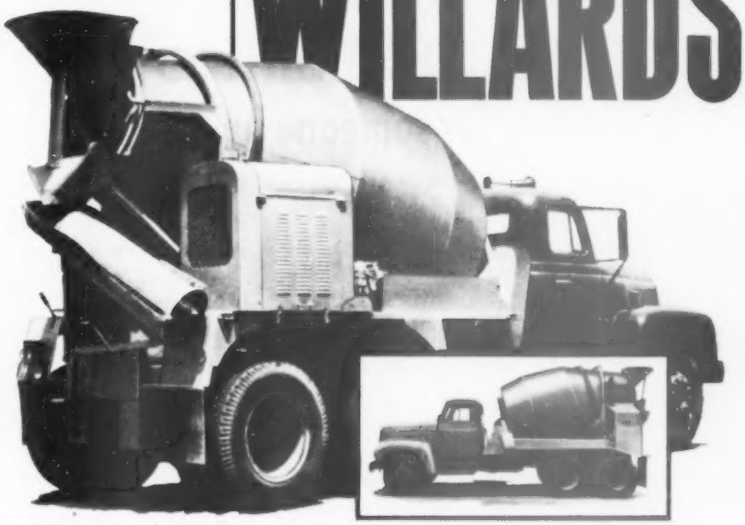
Salt Action on Concrete

THE DISINTEGRATION of concrete surface by salts, added to control icy conditions, has until recently received little attention in Germany. However, they now find that such salt addition is the most economic way of controlling snow and ice, and are becoming concerned with the damage resulting to the concrete. K. Waltz of Stuttgart has been making a study of this problem and has been able to point out the limitations of surface treatments with oils and tars. The Germans are wondering about air-entraining agents and have now constructed sufficient lengths of pavement to produce more reliable data. This was reported in *Zement-Kalk-Gips*, Vol. 6, No. 1, p. 8 (1953).

•

The conveyor set-up shown below handled all mortar, block, lintels and other materials used in construction of the 61-ft. elevator shaft shown partially completed at the right of the building. The conveyor consists of three, separately-powered, 20-ft. Brik-Toter conveyors, combined to reach the 35-ft. level of the lower roof. Later two 20-ft. conveyors were used to reach from the lower to the higher roof. All masonry work was completed in nine working days at a reported saving of 65 percent in handling costs

5 and 6 C.Y. WILLARDS



Featuring optional engines and mountings

Short wheel base truck mounting

Low center of gravity

Heavy duty construction yet light in weight

Combination pedestal and water tank (exclusive)

Chain drive take up by hinged reduction box (exclusive)

Repair parts are standard —available locally

YOU HAVE A CHOICE of drum drives on either the 5 or 6 c.y. Willard. Whether you prefer the rear side mounted Chrysler-6 engine with fluid drive or the rear cross-mounted Ford-6 engine, you get all the outstanding Willard features listed at the left, PLUS rugged construction and conveniently located controls. Combination throttle and "over center" drum brake are standard with Chrysler engine fluid drive. See your Willard dealer for complete details or write for catalog.

WILLARD CONCRETE MACHINERY SALES CO.
11700 Wright Road, Lynwood, (Los Angeles Co.) Calif.

Manufactured in Los Angeles and Galion, Ohio

WILLARD TRUCK MIXERS

PURE SYNTHETIC IRON OXIDE

GIROX RED

NO. 1100

ESPECIALLY SUITED FOR COLORING BLOCKS

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. . . someone who has a going organization which can meet these requirements.

1. Experience in the mass production of concrete products.
2. Selling experience in the construction field.
3. Ability to invest $150,000 in plant and equipment. (You may already have 75% of this if you are now in the concrete business)
4. High credit rating.

Those markets (and others) are waiting for Flexicore, the economical precast concrete floor and roof slab. Some organization in each of those marketing areas will get a profitable, exclusive Flexicore franchise. Perhaps it should be yours.

If so, we will help you set up your plant... teach your men how to manufacture and sell Flexicore... share a national sales promotion campaign with you.

Flexicore is now being manufactured in 20 marketing areas. Present manufacturers are grossing up to $1,000,000 per year. Their profit margin is good. Sales have more than doubled in the past two years, actually an increase of over 130%.

The demand for Flexicore in other areas cannot be met satisfactorily until we have manufacturers on the spot.

If your area does not have a Flexicore plant now and you can qualify, write me for more information.

Robert E. Smith, Vice President
The Flexicore Co., Inc.
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Flexicore is described in Sweet's Architectural Catalog. The Flexicore Co., Inc. is a subsidiary of Price Brothers Co., an AaA1 company. Its owners have been in the concrete fabrication field for 30 years. Flexicore has been proved popular. Its big years are ahead.

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ROCK
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EACH
ISSUE

Letter to the Editor

DEAR EDITOR: In the parade of discussions on *Air Entrainment*, I have noted no theories on the effect of surface tension that is concerned in say 1 percent "air content." I feel that some scholarly research enthusiast, with time and facilities at hand for proper investigations, could discover that surface tension may have some bearing on the air-entrainment effects. It would not be difficult to define and calculate how many square meters of surface area per cubic meter are concerned in Y percent air entrainment. This I am sure may lead to the study of the effect of other reagents that would modify the surface properties of the bubbles. I believe it is the surface tension on the entrained air particles that effects the "lubrication" of air-entrained concrete, even though the forces concerned are only dynes/sq. cm., large areas will show a total of quite a force. Being better acquainted with flotation theories than I am with air-entrained concrete, I have often wondered why some study along these lines has not been made. This is my contribution in asking, why doesn't someone else do it?

Mark Lintz
Mining and
Metallurgical Engineer
San Francisco, Calif.

Roofing Tile

PATENT TILE CO., Ojus, Fla., subsidiary of Giffin Industries, Inc., has announced plans to install additional machinery for the production of new types of cement shingle roofing tile. At present the company produces conventional-type barrel and shingle cement roofing tile, a French cement shingle-type tile and a 2-in. butt cement shingle-type tile, all of which are available in white or colors. After the new machinery is installed, the company will also produce a 1½-in. butt cement shingle tile which is said to be more attractive than the conventional type, and a Spanish "S"-type tile.

White cement or colored facing is applied to the tile by a special process developed by the company, which produces a monolithic finish said to be highly resistant to fungus and to discoloration. The finish is produced in smooth or textured surface.

Prestressed Concrete

MARTIN MAHLER, prestressed concrete consultant, Union, N. J., has presented to the public libraries of 53 major cities, in the United States, its possessions and Canada, a comprehensive collection of textbooks and literature on the subject of "prestressed concrete." This technical library collection is being established by Mr. Mahler in all cities with a population of 100,000 or over in order to make this material available to all people and organizations interested in the subject of prestressed concrete.

Lime-Fly Ash Block

IF FLY ASH AND LIME (which may be carbide sludge) are mixed to the proper consistency, the mix may be extruded from an auger machine and cut into blocks. The Badische Analin- und Sodafabrik in Ludwigschafen in Germany has applied for patents covering the hardening of such block, which have been extruded with numerous holes (30 percent of the section area), using carbon dioxide. It is claimed that the time required is similar to that consumed in autoclaving. An alternate process is to granulate the lime-fly ash mix and press into blocks for similar hardening. The properties claimed are given in the following table.

	Multi-holed block	Pressed granules
Unit weight	73 p.c.f.	63
Minimum compressive	700 p.s.i.	280
Absorption	24 percent	34
"K" factor	2.4	not determined

The article was written by H. Violet and published in *Betonstein-Zeitung*, Vol. 18, No. 12, p. 452 (Dec., 1952).

Concrete Products Folder

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, has published a four-page illustrated folder describing its line of concrete products. Among those illustrated are concrete sewer pipe, both reinforced and non-reinforced; concrete culverts; site-cast pipe in large diameters and long lengths; concrete pipe to convey corrosive industrial wastes; flat-base concrete pipe for industrial tunnels and pedestrian and cattle underpasses; concrete river weights; concrete package bridges; and concrete cribbing. Copies may be obtained from the company at 297 S. High St.

Concrete Masonry Reprint

NATIONAL CONCRETE MASONRY ASSOCIATION, Chicago, Ill., has available reprints of a nine page, four-color article which appeared in the June issue of *House and Home* magazine. The article features a contemporary home designed by Frank Lloyd Wright, showing an imaginative and skillful use of concrete masonry construction. Reprints are available from the association at 38 S. Dearborn St., at a cost of $19 per hundred for 10,000 copies or more, and $23.50 per hundred for 5000 copies.

Concrete Block Plant

RINKER MATERIALS CORP., West Palm Beach, Fla., recently began operation of its new concrete block plant at Fort Pierce, Fla. The plant, built at a cost of $250,000, includes a storage yard sufficient for handling 400,000 finished block. The new plant is under the management of Fred Hoskins and John Glenton. The company also operates a block plant at West Palm Beach. M. E. Rinker, president of the company, has recently been elected president of the National Concrete Masonry Association.

"complete satisfaction... with our Columbia BLOCK SPLITTER"

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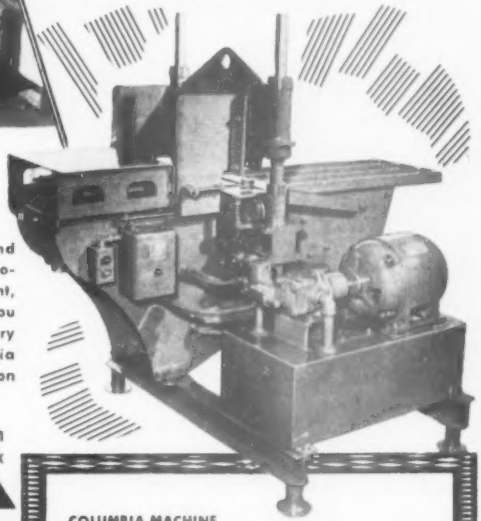

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Acquires Pipe Company

AMERICAN-MARIETTA CO., Chicago, Ill., recently announced the acquisition of controlling interest of Universal Concrete Pipe Co., Columbus, Ohio, which owns and operates 26 plants producing concrete pipe and other concrete products. Control was acquired from principal shareholders of Universal, including H. X. Eschenbrenner, president and general manager, who will remain with the company in a consulting capacity. Other executives of Universal will also be retained. Under the transaction, Universal Concrete Pipe Co. became a subsidiary of American-Marietta Co. Earlier this year, American-Marietta acquired Lamar Pipe and Tile Co., Grand Rapids, Mich., and Concrete Products Co. of America, Pittsburgh, Penn.

Dry-Batch Concrete Plant

TWIN CITY CONCRETE PRODUCTS CO., Minneapolis, Minn., has established a plant in Kansas City, Kan., to handle Sakrete dry-batched concrete. Plant facilities include a screw conveyor and belt conveyor, a bucket elevator, a 500-bbl. cement bin, a sacking machine, and a Trailmobile to handle local deliveries. Floor storage space is approximately 2000 sq. ft. Joe Lambert is president of the company and M. O. Sheil is manager of the Kansas City plant.

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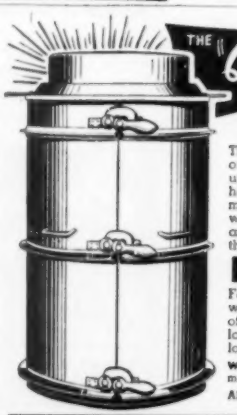

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Improving Concrete

IN A TECHNICAL INFORMATION LETTER to member companies, the National Ready Mixed Concrete and National Sand and Gravel Associations recently called attention to an editorial appearing in the February 15, 1953, issue of the *Indian Concrete Journal*, on "The Causes and Prevention of Cracking in Concrete." The editorial, based on an article by L. Boyd Mercer, chief engineer, Ready Mixed Concrete Ltd., Australia, gives a concise discussion and suggested solution of the problem. It includes a diagram and table to assist in diagnosing the cause of cracking and in determining the precautions to be observed in order to reduce the occurrence of cracks. A number of reprints of the editorial were secured by the associations and made available to their members.

Concrete Conference

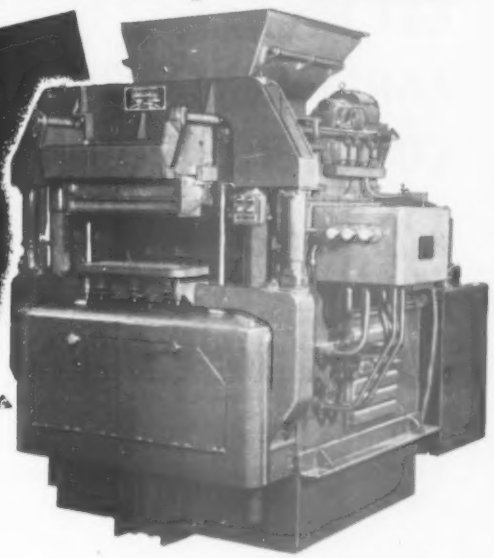
THE SECOND ANNUAL QUALITY CONCRETE CONFERENCE, conducted by Vanderbilt University, Nashville, Tenn., will be held at the university, January 12-13, 1954. The program will feature moving picture films, question and answer panels, laboratory demonstrations, and talks by outstanding authorities in the field of ready-mixed concrete, concrete products, cement manufacture, and testing. The course will be under the direct supervision of Prof. William H. Rowan, Vanderbilt University.

Block Plant

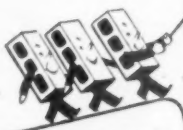
BLOX, INC., recently began operation of its new concrete block plant in Williston, N. D. The company reports that during its first six weeks of operation, over 100,000 block were delivered into construction projects in Williston and the surrounding area. The present plant is housed in a 50- x 100-ft. building. An office unit and a building for the production of prestressed concrete beams and precast steps are to be added. C. T. Rudberg is president and manager, and Ray Zimmerman is plant superintendent.

EXCEEDS 4 CYCLES per minute!

Columbia New, Fully-Automatic 3 BLOCK



Available on Lease-Purchase or Outright Sale



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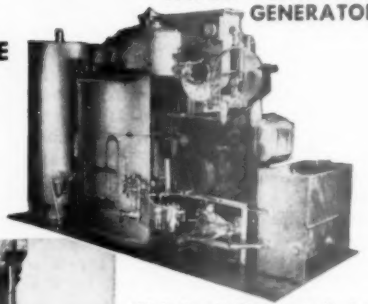

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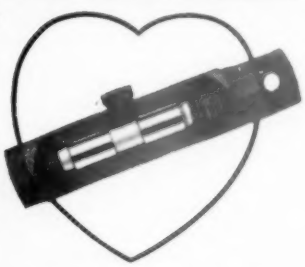

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This *controlled vibration* speeds up and improves concrete production in many fields.

For instance, BRANFORD VIBRATORS keep sand, aggregate, cement, etc. moving in hoppers, bins and chutes. They also help to unload railroad cars smoothly and quickly.

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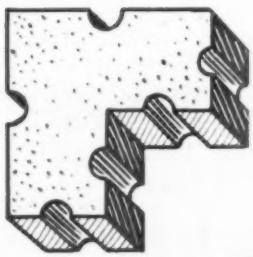
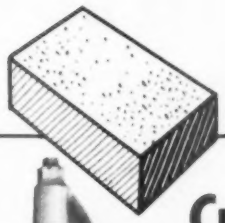

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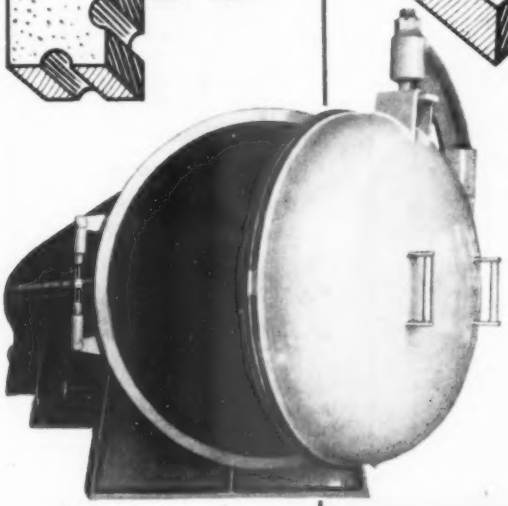

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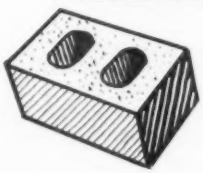

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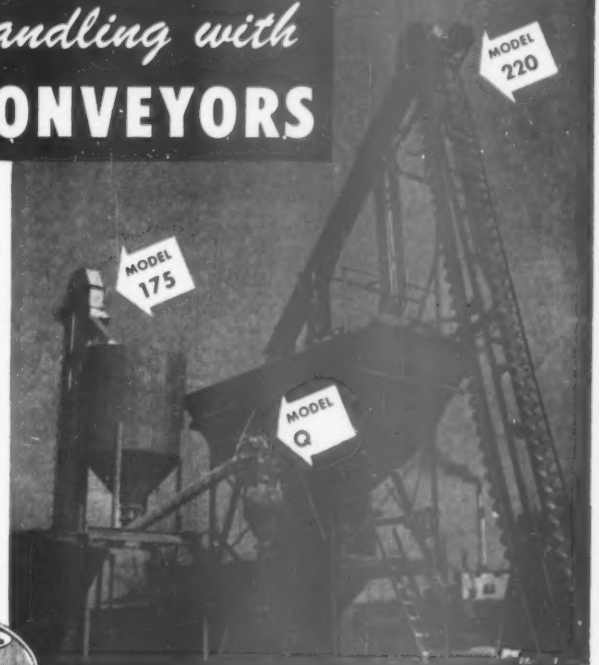

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1—70 ton 4 compartment Lippert aggregate bin w/20,000 lb. 4 Bean Thurman batcher hopper.

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This equipment bought new in fall of 1951 and has worked only on Section 11, Part 11, New Albany Floodwall Project.

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New — Ready To Use!

40,000 BTU capacity

—Burning gasoline, kerosene or diesel fuel.
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Portable, Quick, Clean Heat

Ideal for curing room, concrete plants, work under construction, emergency heat, or auxiliary heaters.

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FOR SALE

One Korpac block machine. One Packcrete block machine. One Dunbrick machine. Pallets, racks lift truck, boiler and lots of other items.

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25 metal racks.
1400 (8x8x16) Steel Pallets.
94 Aluminum Pallets.
Double Bull Nose Sash Attachment.
100 Double Bull nose sash Pallets.
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300 Bull Nose Pallets.
315 (8x12x16) Foundation Pallets.
Package Price $2500—used, but good condition.

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Please send me free literature about cancer.
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STRIKE BACK...
Give to Conquer Cancer

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Services of a man thoroughly familiar with the manufacture of concrete block and construction practices involved.

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999—12 inch steel cored pallets.
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Proved to last as long or longer—yet cost considerably less. Write for prices.
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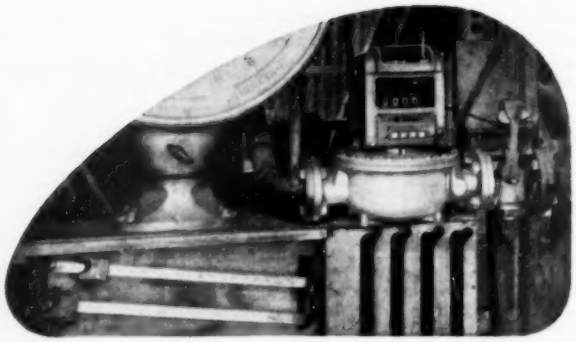

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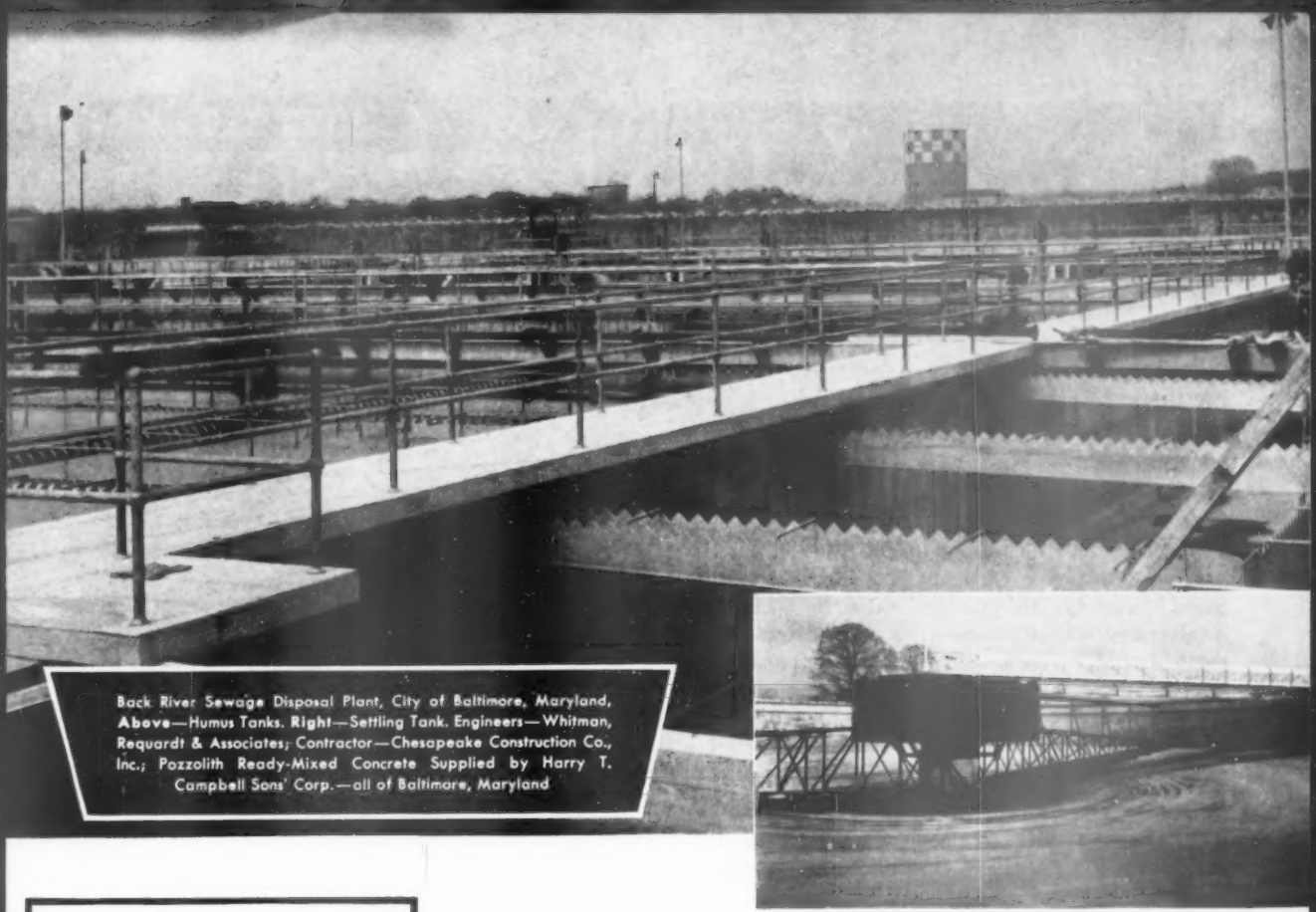

Back River Sewage Disposal Plant, City of Baltimore, Maryland. **Above**—Humus Tanks. **Right**—Settling Tank. Engineers—Whitman, Requardt & Associates; Contractor—Chesapeake Construction Co., Inc.; Pozzolith Ready-Mixed Concrete Supplied by Harry T. Campbell Sons' Corp.—all of Baltimore, Maryland

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"The Ultimate in Block-Producing Equipment"

Owner of Half-Century-Old, Dover, Ohio, Concrete Products Plant, after 35 Years' Profitable Experience with Stearns Equipment, Thus Describes His Complete Stearns 15 Plant, Installed a Year Ago, Because of Its Steady, High Production Rate, Endurance and the Strength and High Quality of Blocks Produced — Day after Day after Day.

Founded in 1903 by the late James Rees in a small shop in Dover, Ohio, the E. J. Rees Cast Stone Company this year celebrated its 50th Anniversary with the renovation and enlargement of plant, curing system and equipment and the operation of a complete Stearns 15 Concrete Block Plant, installed last December. Ernest J. Rees, a son of the founder, has owned and operated the plant since 1923.

The company expects production this year to be in the neighborhood of 3,000,000 eight-inch equivalents on this one Stearns 15. Orders are being filled with all possible speed for hospitals, schools, churches and homes of the area. Leading concrete block engineers from Ohio, Michigan, W. Virginia and Kentucky, who have visited the plant, pronounce it one of the most modern in the country.

Established 1923

Telephone 34881

E. J. REES CAST STONE COMPANY

Manufacturers of
LIGHT WEIGHT INSULATING UNITS
CONCRETE BUILDING UNITS • PRE-CAST STONE

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BOX 228
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September 5, 1953

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Adrian, Michigan

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Almost a year ago we added a Stearns Model 15 equipped with magnetic offbearer and Stearns pallet return. We have been in the block manufacturing business for over 50 years, the last 35 of which we have dealt with Stearns Manufacturing Company. We feel that the Stearns 15 is the ultimate in block-producing equipment.

We average 900 8x8x16 blocks per hour and at the present time are running seven days per week. We feel that this is certainly an endurance test for this push button, automatic operation and find it passes very satisfactorily.

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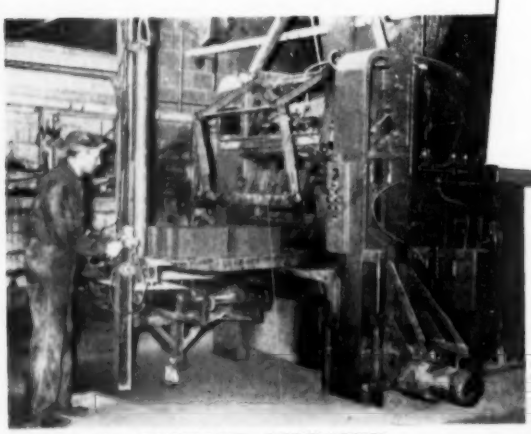
Yours sincerely,

E. J. REES CAST STONE COMPANY

E. J. Rees, Owner

HOME OF VIBRATED BLOCKS



15—PLUS, PERFECT, VIBRATED BLOCKS PER MINUTE—900 per hour. That is the steady, day-in, day-out, production endurance record being made by this one-man, fully automatic, power-operated, push-button-controlled Stearns 15 Concrete Block Machine with power handling of plain pallets. Operating the Stearns Pneumatic Offbearer is William D. Smith, 20-year employee of the E. J. Rees Cast Stone Company.

PROUD OF THEIR 50-YEAR RECORD are, from left, E. J. Rees, owner of the Dover, Ohio, plant; Harry Overton, sales representative, and Miss Elvira Haug, office manager. The Rees Cast Stone Co. covers six acres.

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ADRIAN • MICHIGAN

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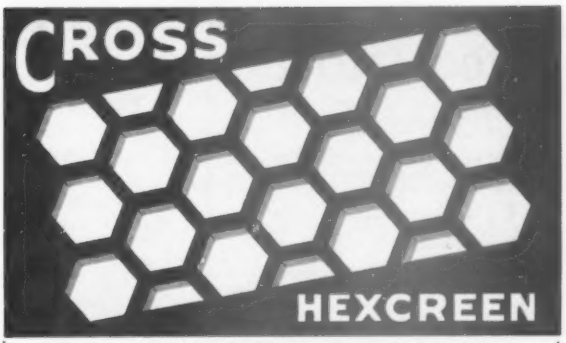

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ROLL: Cedar Rapids 40x22. Diamond 40x22. Pioneer 30x18. Telsmith 24x16. Pioneer 36"x18" New Holland 24x16.
HAMMERMILL: Size 4 Williams Jumbo. Pennsylvania 8X2, 22x22. Cedar Rapids 20x33. Jeffrey 36x42, Jeffrey 36x24, 36x40.
BALL MILL: Hardinge 10'x48", K.V.S. 6'x8' Type M Air swept J H 6'x6', Hardinge Conical 6'x22". Colorado Iron Works 5'x6'; Marcy No 64½ Hardinge conical 10'x36".
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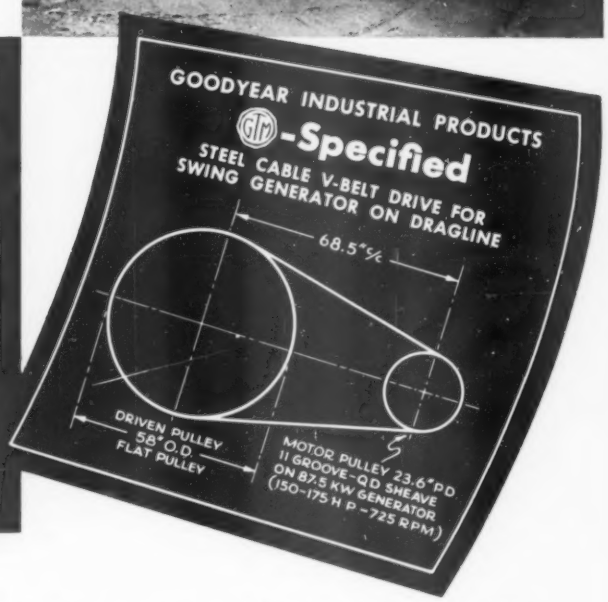
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